April 23, 1945

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1862

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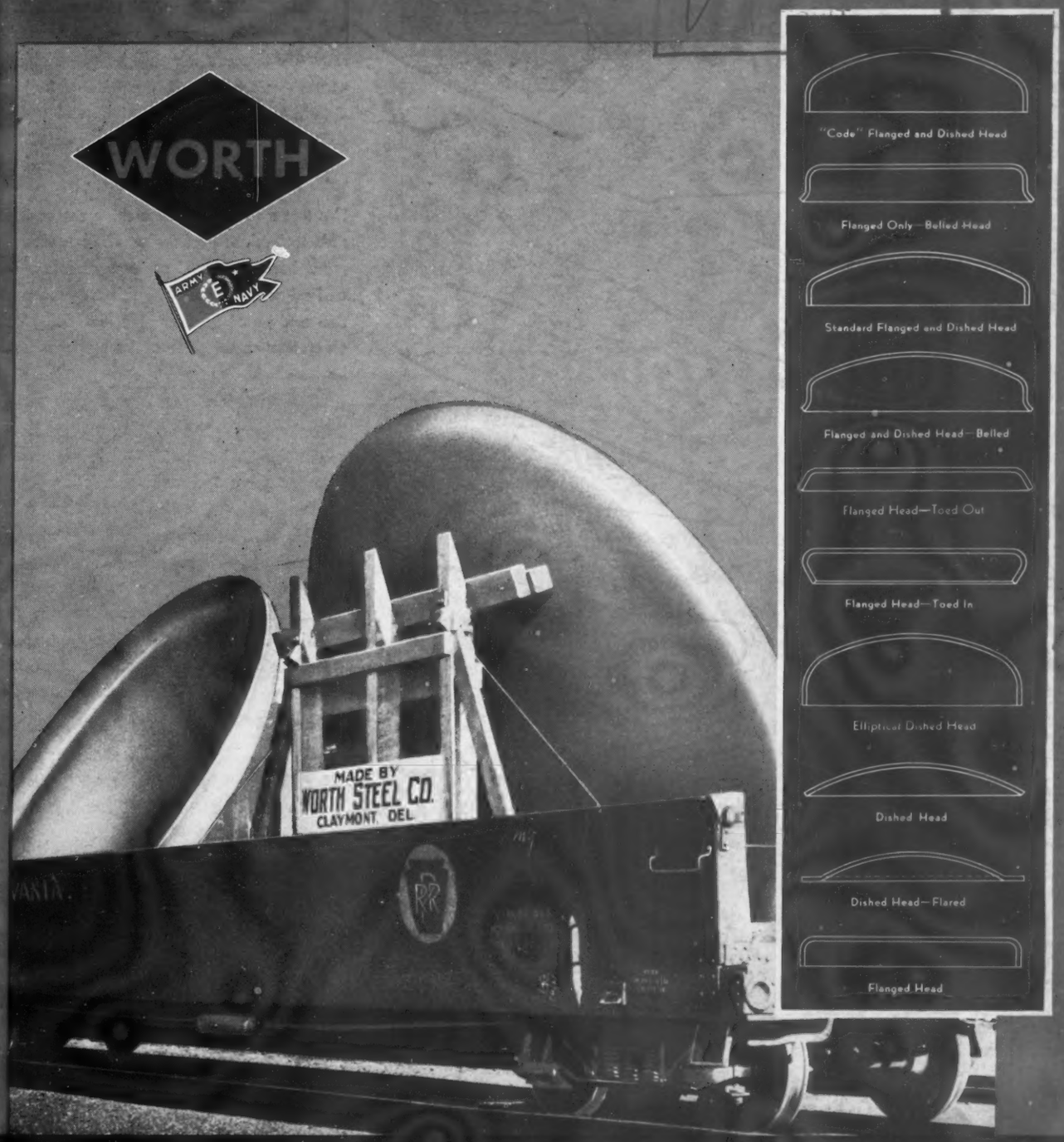
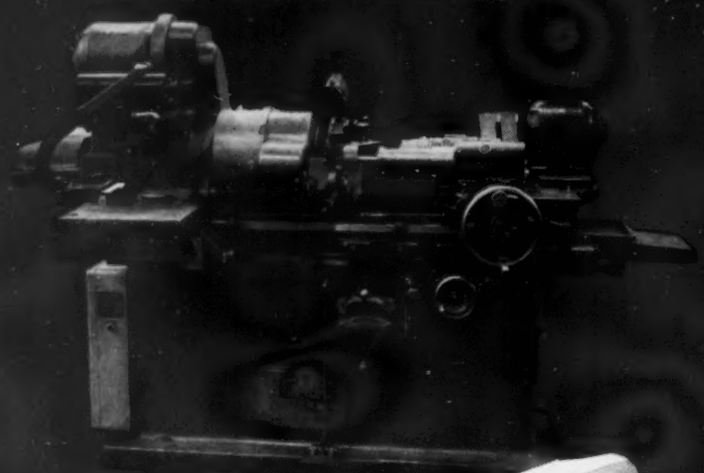


HEALD No. 72A TWO SPINDLE GRINDING MACHINE



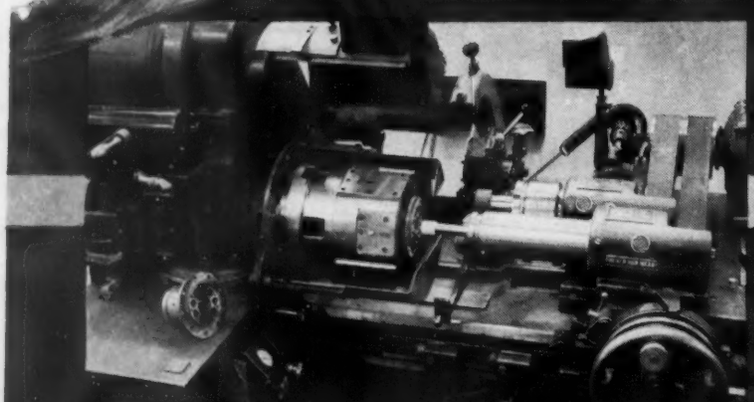
Lower Costs

Minimum Scrap

Squareness of Hole with Face

Greater Production

Fewer Set-Ups



Four operations in one loading. The bore is ground with the front head. The adjacent face is plunged with the rear head. The external rabbet diameter is ground, also with the rear head, after which the flange face is finished in the fourth step.

GIVES YOU ALL FIVE!

IF MANAGEMENT ASKED YOU to name the result most needed in your shop—what would you say? Chances are it would be *one* of the advantages cited here. But, put Heald 2-Spindle Grinding Machines on the job, and you can deliver *all five!*

HERE'S HOW

This two spindle Heald Machine makes it possible to finish several surfaces in one set-up—to grind bores, external surfaces and face front and adjacent surfaces. By selecting the correct size and properly arranging the two spindles, an endless combination of these operations can be handled.

HERE'S WHY

With these multiple operations you get multiple results—each of which is measurable in dollars. Add them up: Increased production because you're completing a number of operations at one loading. Better accuracy *including perfect squareness and exact parallelism* because the same locating surfaces are used for all operations. Minimum scrap because of machine control with less handling. Lower unit costs because of fewer set-ups and increased output from one machine as compared to individual machines for each operation.

We at Heald would welcome the opportunity of working with you in uncovering jobs which can be done faster and better on this machine.

THE HEALD MACHINE COMPANY
WORCESTER 6, MASS.

HEALD

more precision ...less cost!

At your Service

When you have a problem involving steel, its selection, treatment or use, put it up to us. The district offices listed here, and through them Bethlehem's research organization, technical staff and contact metallurgists, are able and eager to serve you in every possible way. No matter where you are located there's a Bethlehem district office within short phoning distance. Make it your headquarters for steel and information about steel. Material shortages remain acute but useful information is still unrationed. We are at your service.

BETHLEHEM STEEL COMPANY, General Offices: Bethlehem, Pa.

DISTRICT OFFICES

Akron 11	Miami & Gault Streets
Albany 7	Standard Building
Atlanta 3	Candler Building
Baltimore 3	Mercantile Trust Building
Boston 10	75 Federal Street
Buffalo 5	Liberty Bank Building
Chattanooga 2	Hamilton National Bank Building
Chicago 11	Wrigley Building
Cincinnati 2	Union Trust Building
Cleveland 13	Terminal Tower
Columbus 15	First National Building
Dallas 1	Tower Petroleum Building
Dayton 2	901 Mutual Home Building
Detroit 2	General Motors Building
Honolulu	Schuman Building
Houston 1	7100 Clinton Drive
Indianapolis 4	Circle Tower Building
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San Francisco 19	20th & Illinois Streets
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Springfield 3, Mass.	Security Building
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Washington 5, D. C.	American Security Building
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York	Manufacturers Association Building

EXPORT DISTRIBUTOR: Bethlehem Steel Export Corporation, 25 Broadway, New York 4, N. Y.

SECURITY.....

The first requirement of any machine is that it will stay on the job. Protection against mechanical troubles and breakdowns is assured by the simplicity of Ingersoll-Rand design and the high standards of manufacture, materials and service maintained by the Company.

COMPRESSORS
•
TURBO BLOWERS
•
AIR TOOLS
•
ROCK DRILLS
•
CENTRIFUGAL PUMPS
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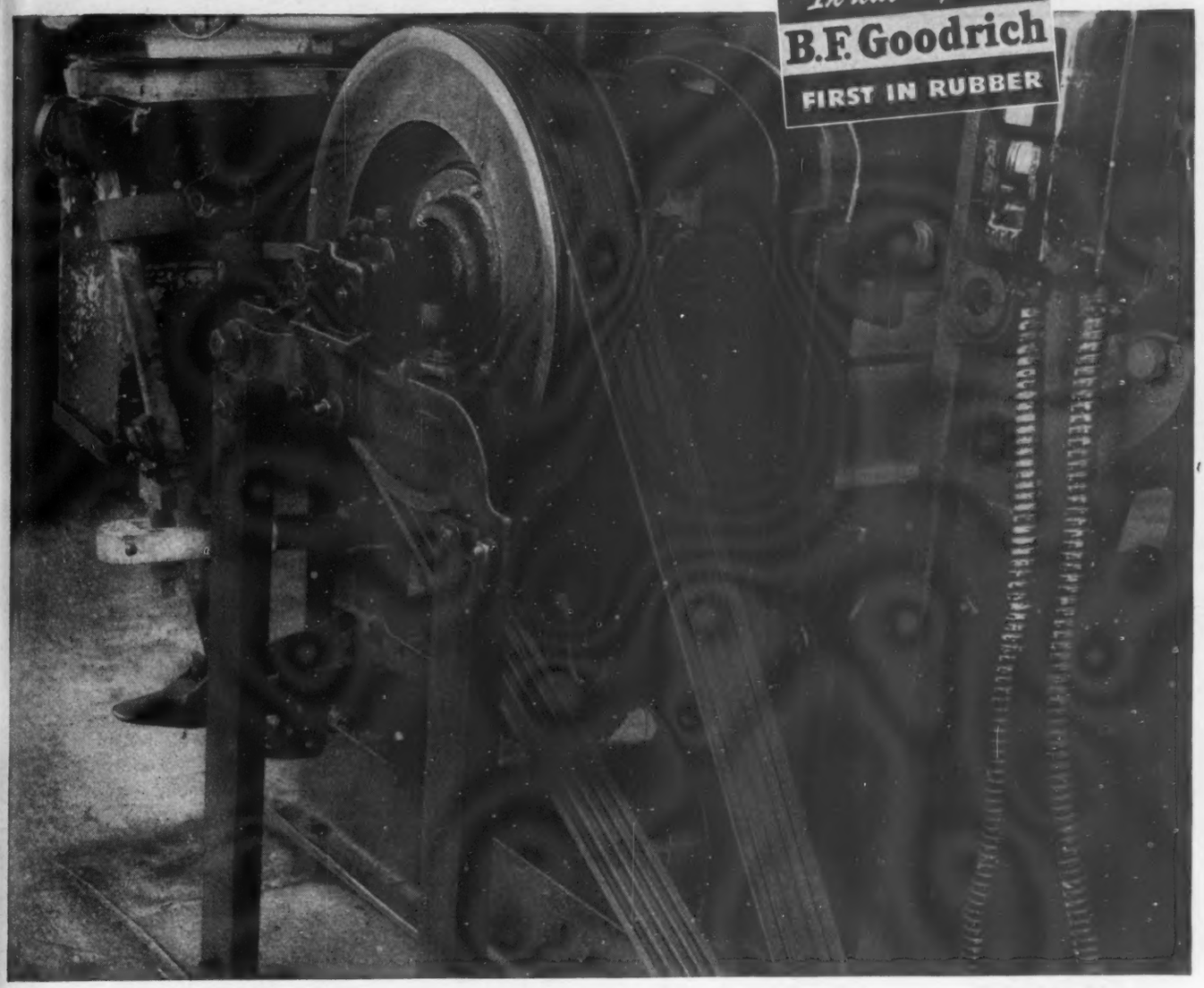


B.F.Goodrich multiple V-belt drives here outlast gear drives 4 to 1

Successful experience in textile loom service points way to increased industrial use

FOR years, textile men said that V-belt drives couldn't be used on heavy duck looms. And they were right —until recently. The low-stretch, non-resilient V-belts of a few years ago couldn't meet the demands of this severe and exacting service. They were all right for spinner or twister frames —but not for looms.

Then B. F. Goodrich developed the shock absorbing, resilient, high flexing V-belt that is known throughout industry today. Six years ago loom tests were begun. Since then, B. F. Goodrich multiple V-belt drives have proved in actual service that they offer the following distinct advantages over gear drives for textile looms:

1) Average gear life, 6 months; average V-belt life, 2 years. 2) Sharply reduced maintenance time and costs. 3) Smoother operation of the delicate looms. 4) Reduced noise. 5) Reduced time and cost for replacement. 6) Shock absorbing qualities not present in positive transmission. 7) V-belts absorb peak loads, save and extend life of loom parts. 8) A quick and cheap way of changing loom speed by using a variable pitch pulley.

Your B. F. Goodrich distributor will be glad to translate these *proven* advantages into terms of your own power transmission needs. Or if you have any other problem involving the use of rubber, the chances are that it can be solved by one of the 32,000 B. F. Goodrich rubber products. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich

RUBBER *and* SYNTHETIC *products*

BEHIND THE SCENES

Seven Wonders of the World

■ Up in Westfield, Mass., in the offices of the Westfield Mfg. Co. who normally build bicycles and who are currently assembling bearings and scores of small parts for war equipment, there hang the following "Seven Wonders of the World," copied off and sent along the other day by our astute New England editor, L. E. Browne.

The man who will work without being watched.

A sales manager who doesn't think he pays the old man's salary.

A salesman who thinks that perhaps the quality of material may have something to do with his making those large contracts.

A stenographer who knows punctuation, and will look in the dictionary when she is uncertain about the spelling.

A purchasing agent who doesn't think he is doing you a favor when he asks you to quote.

A new superintendent who will wait a week before installing a much better system than his predecessor's.

A boss who acts as if he wasn't.

Without too much encouragement we could add a couple more to that list, but perhaps that insults enough people for one week.

Stymied

■ But referring back to the stenographic wonder of the world, it reminds us of the business man who was complaining bitterly the other day about his inefficient secretary. "She's just awful; can't spell; can't type, no personality—just a poor excuse!"

"Good grief," said we, a bit baffled, "why don't you fire her?"

"I can't," he replied, "She owns the typewriter."

Cat Problems

■ Jack Lathrop, whose vocation is advertising manager of our sister mag, *The Foundry* and whose avocation is fancy magic as many of you know, dropped in to see his good friend Arno Witt at Schramm, Inc., West Chester, Pa. a few days ago, and Mr. Witt conducted Jack on a tour of the plant.

During the visit, Jack lagged behind at one point to kneel down and return the affection of a beautiful big tiger cat who seemed to have the run of the plant. All of which brought out the story, which, it seems to us, will present quite a problem to the War Labor Board, the Wage Stabilization boys, and perhaps even cause some kind of a crisis in C. I. O. and the A. F. of L.

Mr. Witt explained that here so far as he knew was the only cat who was officially on a company payroll. She (or he) had done such an excellent job in protecting the insulation on certain exposed wires, by means of mouse and rat elimination, that kitty was put on the books as an official employe.

Now, naturally the job she has is 24 hours a day, seven days a week, which by all good government and union rules should entitle her to the minimum hourly pay of catnip for forty hours, and time and a half for 128 hours a week. But even so, such terrific hours should be called to the attention of the grievance committee. And, furthermore, is the correct amount of catnip being withheld for income tax and another portion put away for old age security? Does said cat have its own washroom facilities, and does the workmen's compensation insurance cover all of its nine lives?

Oh, Mr. Witt, you never should have done it.

More on Rat Traps

■ And there's even another complication on this cat and rat business. What about the competition with the commercial rat trap manufacturers? This comes to mind because of the letter just in from Norman A. Porter of McGill Metal Products Co., Marengo, Ill., whose bid for rat traps was mentioned here a couple of weeks ago. Mr. Porter writes:

While it is true that the trap business is booming due to an increased rodent population encouraged by poor sanitation facilities, and unusual concentration of war workers, the Navy bid which you mentioned (and which we won) was really peanuts compared to an Army bid issued at the same time for export of 448,203 rat traps (which we also won).

Incidentally, the steel industries are obviously a major cog in the U. S. war-making ability, but we trap manufacturers throw out our chests every so often when we get relieved letters from mayors of war-booming towns who have finally controlled a rat-bourne epidemic or a note from a Marine whose sleep was disturbed more by rats running over his chest than by Jap night attacks.

And then he spoils it all by adding this P. S.

If you get three power mowers we can make good use of one!

Respectable Boarding House

■ According to this unexpurgated set of rules for a pretty thoroughly policed boarding house in Washington, D. C. the girls who live there do not have to guess what they cannot do. The rules read:

"One things got to be made clear here and now . . . this is a respectable house, owned and operated by a respectable lady who is never been married twice. There is girls in Washington now who is not so respectable. If you is one of them, take heed and leave before the wrath of us respectable tenants is upon you!

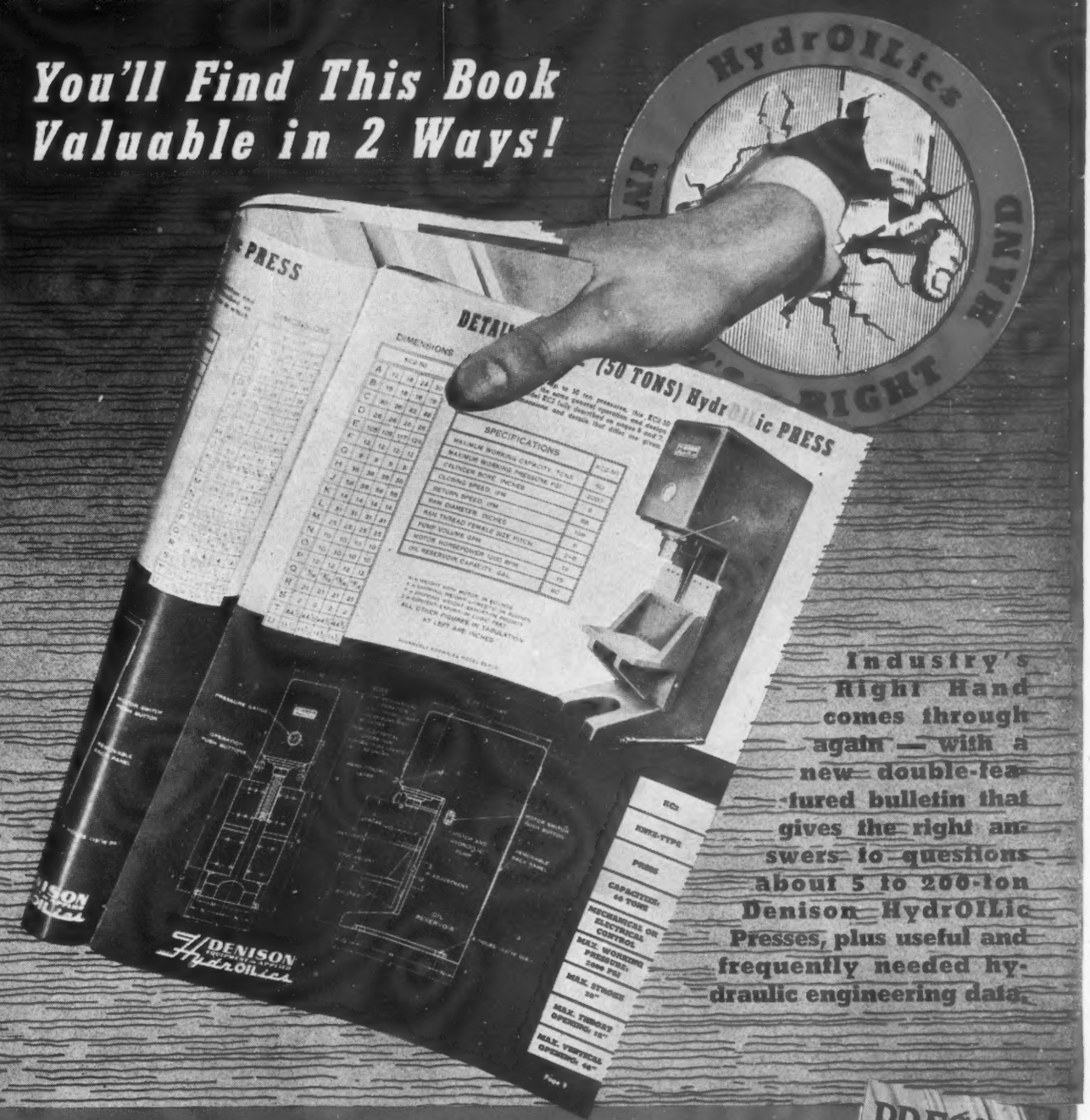
"Other things that will be told of are, 1) Use your own cake of soap in the bathtub and not the other fellows. 2) Don't listen to lewd stories on the radio and if you do turn them off by ten o'clock. 3) Men is not allowed upstairs only if you is lawfully wed and then door must be left open. 4) Not paying bills will not be put up with. 5) We is not responsible for things left in room because of crooks and you will please not steal things. 6) Republicans will not cuss Democrats and Democrats will not cuss Republicans out loud. 7) There will be no smoking or drinking or flirting with Mr. Davis who waits on table or else there will be trouble and the worlds so full of misery for that. 8) Be careful what kind of books and mags you bring in here.

"Attention! Heed this warning, else the wrath of us respectable tenants will be upon you!"

Vol. 116, No. 17, April 23, 1945, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

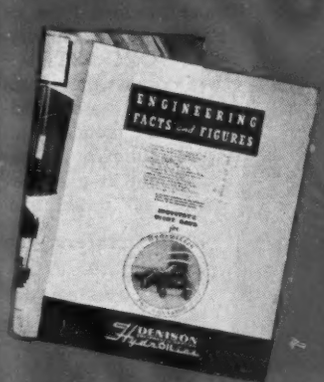
Editorial Contents—Page 53

You'll Find This Book Valuable in 2 Ways!



Industry's Right Hand comes through again — with a new double-featured bulletin that gives the right answers to questions about 5 to 200-ton Denison HydrOILic Presses, plus useful and frequently needed hydraulic engineering data.

Yours For The Asking



This new bulletin is packed with the kind of complete hydraulic press data you want. Note in the typical page above how the conveniently tabled specifications and detailed drawings give you facts *quickly*—without fuss or frills—on Denison's complete line of standard HydrOILic presses in the 5- to 200-ton range. And in addition, you'll find the tables on pages 19 to 29 a most helpful collection of hydraulic engineering data. Write for your copy of this new bulletin today . . . on your company's stationery, please. The Denison Engineering Co., 1163 Dublin Road, Columbus 16, Ohio.

DENISON
EQUIPMENT in APPLIED
TRADE-MARK HydrOILics

THE COMING TOOL FOR THE SHEET-METAL SHOP . .

Already established as one of the big factors in sheet metal production, the Chambersburg CECOSTAMP merits the thoughtful consideration of every shop superintendent or other executive.

PROVED IN WAR'S TREMENDOUS PRODUCTION OF PLANES

Invented and built by Chambersburg engineers for the urgent demands of the aircraft industry, the CECOSTAMP was immediately accepted and is now in daily use in practically every airplane factory both here and in Allied plants abroad.

DIES ARE QUICKLY MADE • ARE DURABLE AND SALVAGEABLE

CECOSTAMP dies are cast from lead, zinc and other soft metals. This die material has been so improved that today 20,000 to 30,000 drop stampings can be produced on a single set of dies.

HIGH PRODUCTION IMPACT STAMPING

The use of high-strength sheet melals such as stainless steel and many aluminum alloys presents a formidable problem that taxes the most modern type of stamping machinery. The CECOSTAMP overcomes the resiliency of these hard-to-form metals and gives them a permanent set at a higher rate of production.

Manufacturers who investigate NOW will have an advantage. Write for catalogue.

CHAMBERSBURG ENGINEERING COMPANY • Chambersburg, Pa.

Electrical Way to Get More Ingots

—WITH AN ALLIS-CHALMERS ARC FURNACE SUBSTATION

LOWERING OPERATION costs and boosting ingot output of arc furnaces is the aim of Allis-Chalmers in designing unit-responsibility substations — like the one illustrated below.

Elements featured in the drawing are quick-acting Regulex electrode control, and a low maintenance furnace switch for disconnect duty, coordinated through the operator's control with furnace transformer and control current transformers.

The sturdy disconnecting switch is expressly designed for repetitive arc furnace duty. Only slight maintenance is needed . . . contacts are long-lived.

Allis-Chalmers also supplies a low-maintenance air blast interrupter for service up to 22,000 volts.

Revolutionary Regulex control, shown below, pays dividends to operators by making possible extra "heats" per day . . . because it's faster-acting.

The Regulex set has no contactors to maintain. Its great amplifying characteristics and instant response to arc current and voltage eliminate power waste — and *all* with the ruggedness and reliability of standard rotating electrical machinery!

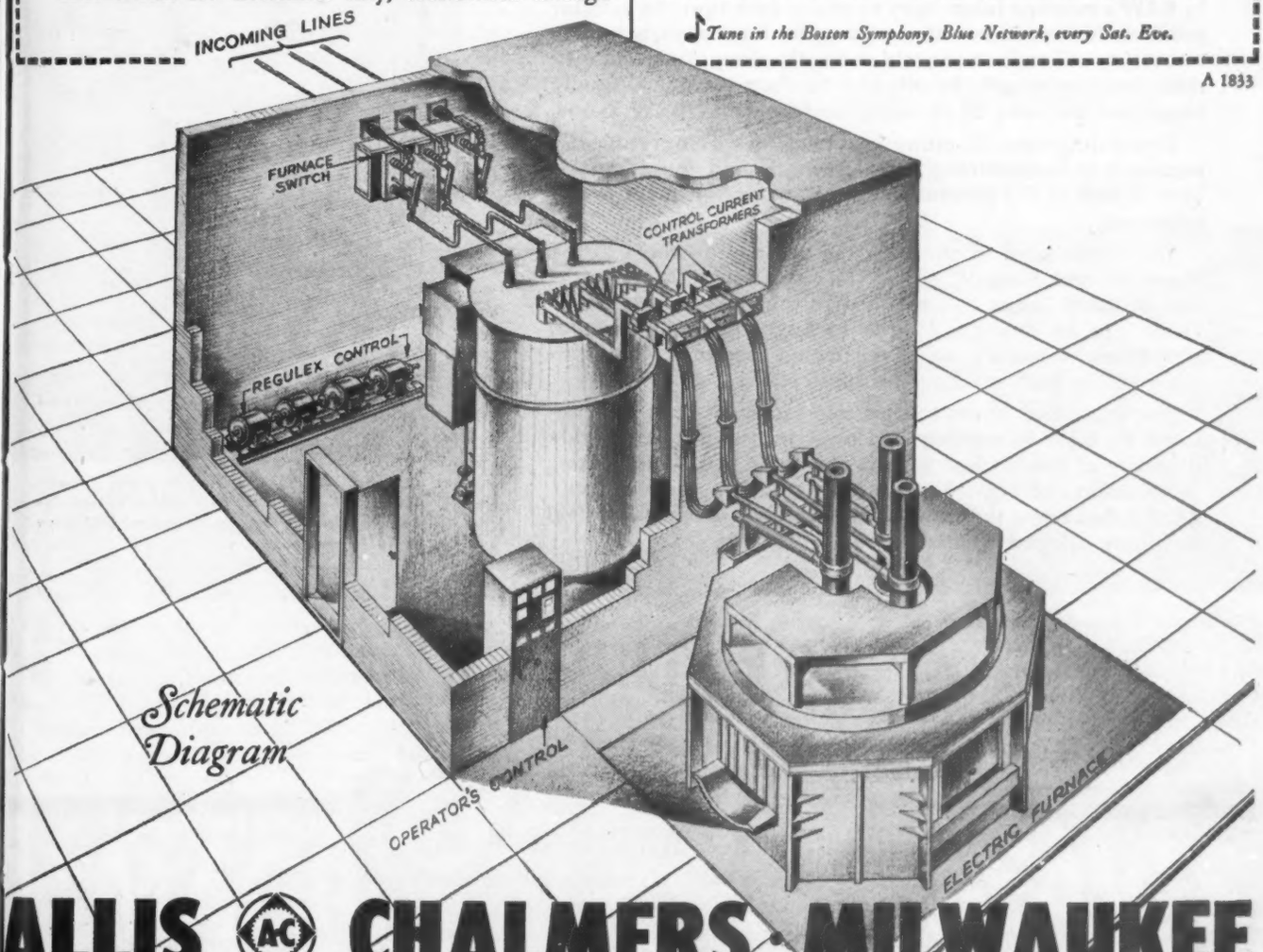
As added features, Regulex control can be equipped with flywheels which automatically raise electrodes when power fails, and an auxiliary generator, for making the control independent of a d-c shop source when desired.

Remember, Allis-Chalmers makes a complete line of furnace electrical equipment. There's undivided responsibility — no "buck-passing."

For complete information, call our district office. Or write direct to ALLIS-CHALMERS, MILWAUKEE 1, WIS.

♪ *Tune in the Boston Symphony, Blue Network, every Sat. Eve.*

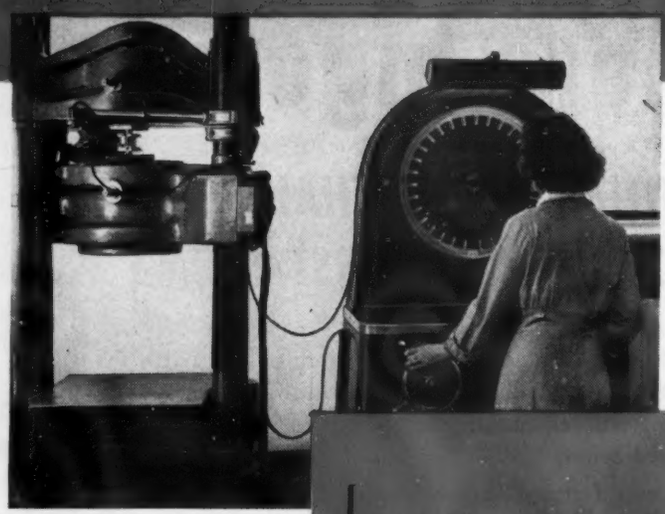
A 1833



Schematic Diagram

ALLIS CHALMERS · MILWAUKEE

B&W Maintains Technical Control of Tubing Through Tensile Tests



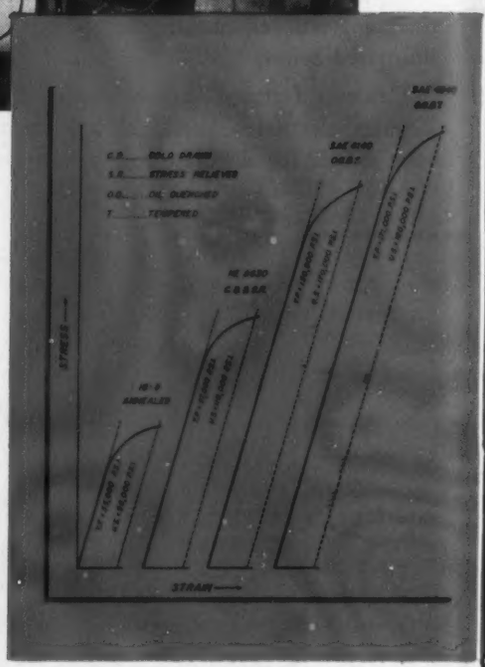
Strain on specimen subjected to stretching on 300,000-pound tensile testing machine is autographically recorded.

Literally hundreds of tensile tests are made daily in B&W's modern laboratory to make sure that the tubular products furnished by the company conform exactly to customers' specifications of yield strength, elongation and ultimate tensile strength. Results of these tests serve the equally important purpose of checking uniformity of B&W Tubes.

Strain diagrams, in many instances, are autographically recorded in determining yield strength and these reports form a part of the permanent record of each test for future reference.

These extensive tensile tests are but one example of the thorough metallurgical supervision applied to the production of B&W Tubes . . . are one of the reasons why B&W Tubes can be depended upon to have the right physical properties necessary to give lasting dependability and economy in each mechanical application.

The vast fund of experience and technical data accumulated by B&W in making and applying tubing for a wide diversity of mechanical uses is available to all tube users, in selecting the right kind of tubing for any requirement. B&W Tubes cover the complete range from low carbon steel to highly alloyed stainless steels.



Reproduction of a recording of strain curves—showing tensile and yield point values for B&W tubular products under several conditions of heat treatment.

B&W TUBES

SEAMLESS. Complete range of carbon, alloy and stainless steels. Sizes: ½ in. to 8⅝ in. O.D.

ELECTRIC-RESISTANCE WELDED Carbon steel grades. Sizes: ¾ in. to 4 in. O.D.

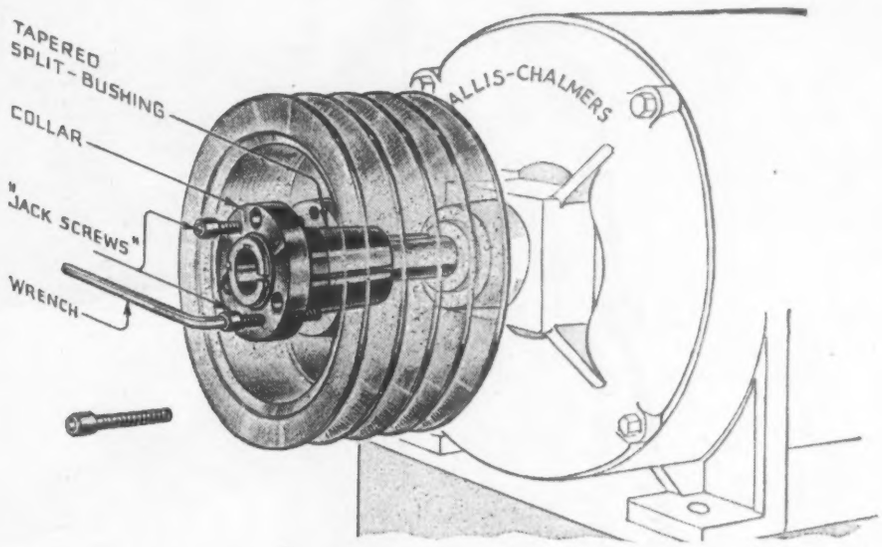
THE BABCOCK & WILCOX TUBE CO.

Welded Tube Division, Alliance, Ohio — Seamless Tube Division, Beaver Falls, Pa.

TA-1806

X-Ray View

OF ALLIS-CHALMERS' NEW "MAGIC-GRIP" SHEAVE



Fastest mounting and demounting sheave on the market, the new "Magic-Grip" costs you nothing extra.

1 **Remove three capscrews** from bushing collar. A handy wrench —supplied with each sheave—is the only tool needed to remove Allis-Chalmers' new "Magic-Grip" from motor or machine shaft quickly and easily.

2 **Insert two capscrews** in tapped holes. As screws are turned, they become levers . . . automatically breaking tight grip of tapered split bushing on sheave and shaft. Entire unit is then ready for removal.

3 **Remove sheave from shaft.** Requires no mallet, no prying, no bulging muscles. You just slide the sheave off . . . smoothly, quickly. *It costs nothing extra!* Send for B6310. Allis-Chalmers, Milwaukee 1, Wis.

A 1770

Allis-Chalmers Texrope

"MAGIC-GRIP" SHEAVES

"Certainly we're ready to talk elevators"...

DURING the past several years, the manufacturing facilities of the Otis Elevator Company have been devoted largely to the production of a great volume of specially designed elevators and precision equipment for a number of vital war requirements.

And, as long as the war lasts, a large part of these facilities will continue to be devoted to the production of war goods.

Right now, however, the Otis Elevator Company is in a position to help you *plan for your post-war elevator needs.*

Your Otis representative is ready to serve you. He is available to analyze fully your elevator problems and to make recommendations concerning the equipment which will be best suited to your post-war requirements.

By planning now, you will be assured that a minimum of time will be lost in getting your required equipment in production after war restrictions have been removed.

So, to be certain of the last word in vertical transportation for present or proposed office buildings . . . for hospitals, hotels, factories, or warehouses, call your Otis representative *today.*

Otis ELEVATOR COMPANY
OFFICES IN ALL PRINCIPAL CITIES

AUTOMATIC OPERATING CYCLE Makes No. 000 Productive on Small Parts Milling

Operator simply—

1. Loads work
2. Pulls starting lever
3. Unloads the completed piece

—and with this fast cycle you obtain

Minimum non-cutting time
Accuracy of feed engagement
Accuracy of table reverse

Ask about the No. 000 Plain Milling Machine's many features for **High Output** with **Maintained Accuracy.**

BS BROWN & SHARPE MFG. CO. PROVIDENCE 1, R. I., U. S. A.

BROWN & SHARPE

SAFETY
GRINDING WHEELS

YES—EVEN FOR THE JOB THAT'S DIFFERENT!

Maybe yours is just run-o'mine grinding. Or again, you may require precision grinding. Whatever the nature of your grinding operation, remember that in the extensive SAFETY line of Grinding Wheels there's a correct combination of grain, grade, porosity, and wheel size that, in effect, is made specially to your order for the work you have to do.

That's a result of many years of specializing and experimentation on grinding wheels design and construction — of years of personal contact with shop operators, foremen and superintendents learning at first hand their grinding problems, and developing the "know-how" to solve these problems.

So even if your grinding requirements are different, the chances are that SAFETY Grinding Wheels have much to offer that you are not now getting in greater output and lower cost of better grinding. We'd like to tell you more, write or phone for details today.

SAFETY GRINDING WHEEL AND MACHINE COMPANY

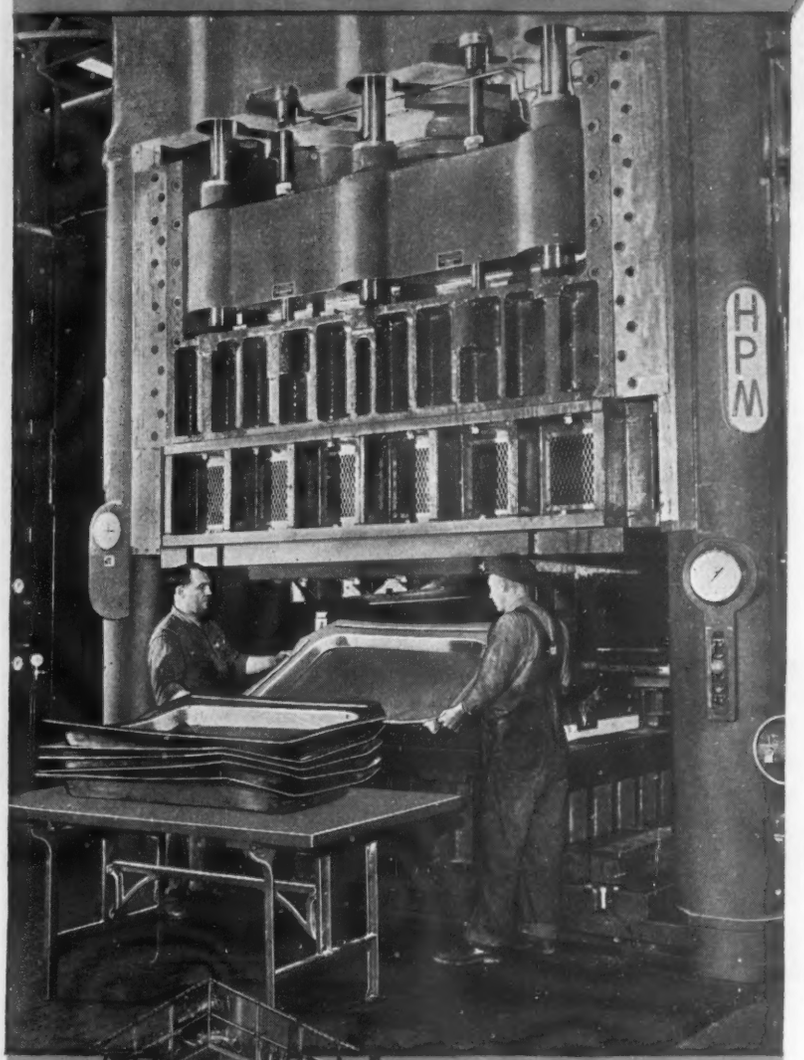
Main Office and Factory SPRINGFIELD, OHIO, Phone 4651

● Birmingham—3-3323 ★ Chicago—TRiangle 8308 ★ Cleveland—EXpress 1445 ★ Detroit—TOwnsend 8-4740
★ Pittsburgh—ATlantic 5218 ★ Erie—23-093 ★ Philadelphia—WAlnut 3132 ★ St. Louis—CEntral 3676
★ Syracuse—3-2131 ● Milwaukee—Mitchell 0265 ★ Toledo—MAin 6637

● *Sales Offices and* ★*Sales Offices and Warehouses maintained for quick service and deliveries.*

The VERSATILE H·P·M "All-Hydraulic" PRESS

A proven design for the mass production of DEEP DRAWN sheet metal parts ★ ★ ★



● Designed for use with either single or double-action dies, the H-P-M "All-Hydraulic" press has become the production standard for sheet metal forming. Each press is completely self-contained, beng powered by the reliable H-P-M oil-hydraulic power unit. The hydraulic blankholder and die cushion function without additional sources of hydraulic power.

The advantages of the H-P-M press are legion. Check the ten H-P-M press features listed below:

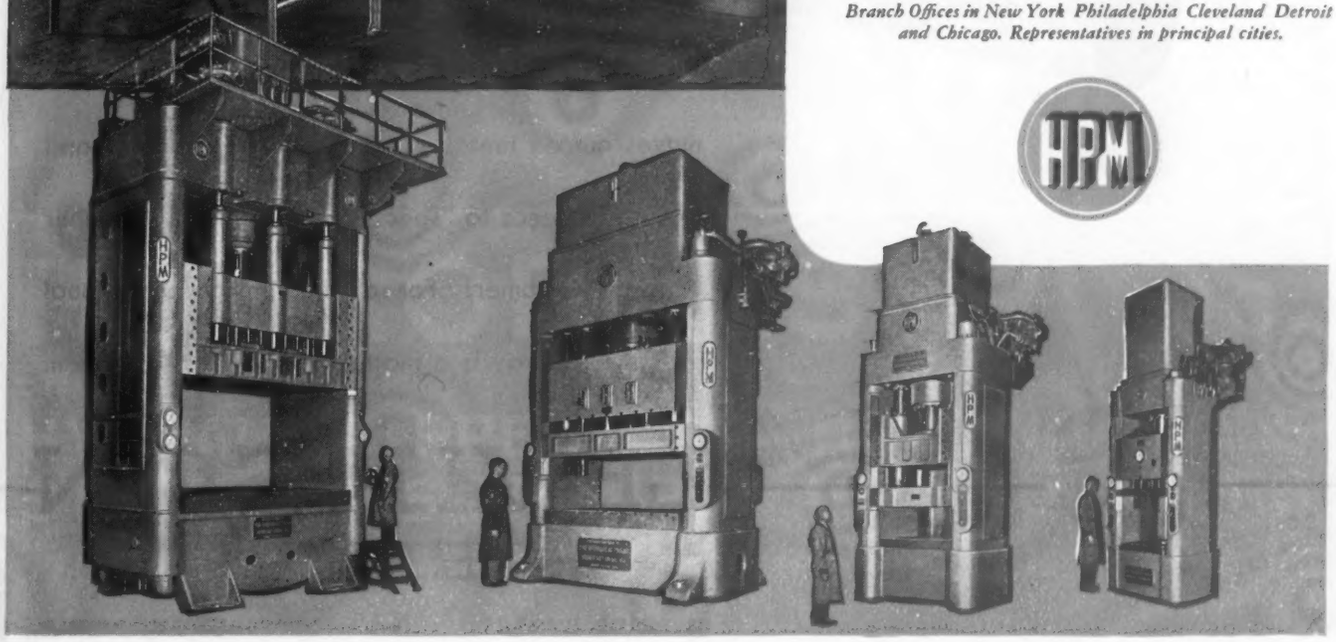
1. Fast action with automatic cycle control.
2. Press reversal at a predetermined pressure.
3. Maximum pressure at any part of the stroke.
4. Convenient hand wheel pressure control.
5. Positive overload protection.
6. Precision hand wheel press travel control.
7. Total elimination of cranks and clutches.
8. Variable speed with automatic slow-down.
9. Closed circuit system with shockless reversal.
10. Blankholder pressure independently adjustable at four corners.

H-P-M presses are built in many sizes. Write today, stating your requirements.

THE HYDRAULIC PRESS MFG. CO.
MOUNT GILEAD, OHIO, U. S. A.

Branch Offices in New York Philadelphia Cleveland Detroit and Chicago. Representatives in principal cities.

HPM



...Out of the Blue!

• A design takes shape . . . the fabricated steel moves out on time . . . accurate workmanship and close adherence to "specs" the keynote . . . another satisfied customer! For accomplishing the unusual in the usual way is a matter of routine at Levinson.

LS-1

The LEVINSON STEEL CO.

33 PRIDE STREET • PITTSBURGH, PENNA.

HYDROPRESS · INC.

ENGINEERS CONTRACTORS

HYDRAULIC PRESSES · ROLLING MILLS
STRETCHERS · PUMPS · ACCUMULATORS

570 LEXINGTON AVENUE · NEW YORK · N. Y.

LORAIN CRANE DOES WORK OF 50 MEN!

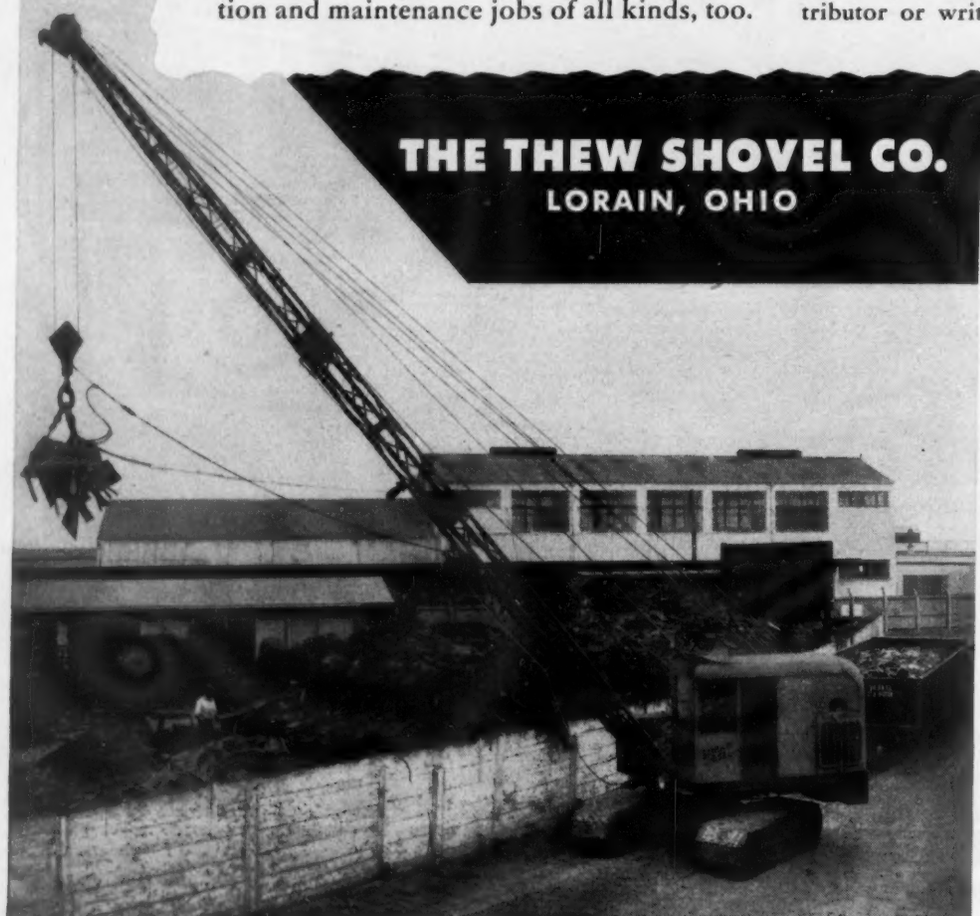
BEFORE installing a Lorain Crane, this large steel company unloaded cars of scrap by hand. Ten men could unload a car in eight hours. Today, one man unloads five and six cars in eight hours with this magnet-equipped Lorain Crane. Needless to say, handling costs were drastically reduced.

What this firm did, you, too, can do on any operation involving handling of large amounts of materials. In addition to cutting costs on handling of all kinds of stock, loose materials and packaged goods, a Lorain will pay its way on plant construction and maintenance jobs of all kinds, too.

14 MACHINES IN ONE!

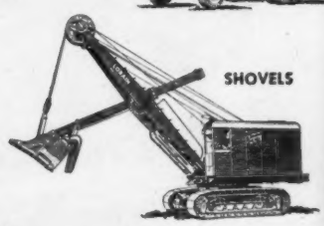
There's a type and size of Lorain to fit your job best. The complete line includes large and small crawler-mounted machines, Moto-Cranes (highly mobile, high speed, rubber-tired cranes), and rubber-tired Self-Propelled Cranes which are driven and operated by a single engine and operator. And *every one* can be used these 14 different ways: with clamshell, dragline or orange peel buckets; magnet; skips; grabs; concrete buckets; slings; grapples; skull cracker; hook blocks; tongs; special hooks; LCL containers.

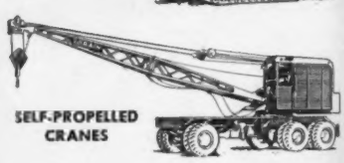
Start early on your Lorain plan to cut material handling costs—see your nearest Lorain distributor or write for complete literature now!

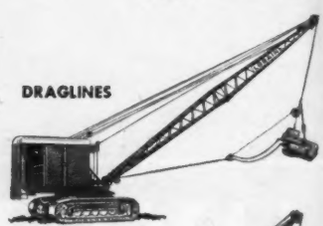


THE THEW SHOVEL CO.
LORAIN, OHIO

MOTO-CRANES


SHOVELS


SELF-PROPELLED CRANES


DRAGLINES

CRANES

Reg. Trade Mark
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2 TO 5 TIMES LOWER GRINDING COSTS

GRIND CARBIDE-TIPPED TOOLS AND DIES BETTER!

You can now get a better edge on carbide-tipped tools and dies—and no burns or discoloration. Grind them with the Por-os-way wheel with *green* silicon carbide. Back from the war, this remarkable ingredient does the trick in this *toughest* of Por-os-way wheels.

MORE JOBS after the war ..IF production is kept high ... F wages are fair. . . IF labor cooperative . . . IF laws are elpful . . . IF taxes are sensible.

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IF there's such a thing as machinists' paradise, your men will be in it when they work with Por-os-way Grinding Wheels. Take it from users who've lived with this wheel for four tough years. They found it cuts hardest metals deeper, faster and cleaner. They learned that *open structure* Por-os-way works cooler, lasts longer and saves time on both rough grinding and precision finishing. They cut down rejects, boosted war production.

And in the peacetime of the future, Por-os-way will cut grinding costs way below competition. But don't take *our* word for it—make us *prove* what Por-os-way can do. Call in a Por-os-way engineer. A. P. de Sanno & Son, Inc., 436 Wheatland St., Phoenixville, Pa., Since 1893.

LOOK AT THE DIFFERENCE!

Your eye tells you at a glance why Por-os-way is *different.* See the *extra porosity* that gives you over 8 distinct operating advantages!

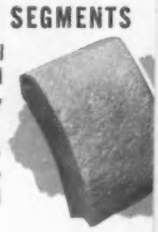
RADIAC*

POR-OS-WAY*

The Precision Grinding Wheel

THE WHEEL THAT COSTS THE MOST AT FIRST . . . COSTS THE LEAST AT LAST

SKY'S THE LIMIT WITH POR-OS-WAY SEGMENTS



Find a surface grinding record and you'll find Por-os-way segments. They hog off more metal with fewer passes at higher speed. Por-os-way cuts deep, doesn't "scrape" the surface . . makes no moan, no groan, no grunt. Less time out for dressing, too. Give *your* surface grinding wings, yet hold costs down to ground level . . . with Por-os-way!

Air Express

THROUGH COORDINATED ENGINEERING

Fast movement of bulk materials has presented an important wartime problem in keeping production channels open.

Here is one example of how a specially engineered rubber belt conveyor effected important savings in getting out coal quickly. Bridging a valley from mine to preparation plant, this aerial short-cut saves valuable hours and materials.

In planning this unusual installation, mine engineers, designers of mechanical equipment, and U. S. Rubber engineers worked as a group. The descending, suspended rubber-belt conveyor, developed by this three-way team, has proved efficient and economical. In descending with its load the 48-inch U.S. Rubber Conveyor Belt develops power that is returned to the line.

If you have a problem which can be solved by an engineered rubber product, our engineers will be glad to work with you.

Listen to "Science Looks Forward"—new series of talks by the great scientists of America—on the Philharmonic-Symphony program. CBS network, Sunday afternoon, 3:00 to 4:30 E.W.T.

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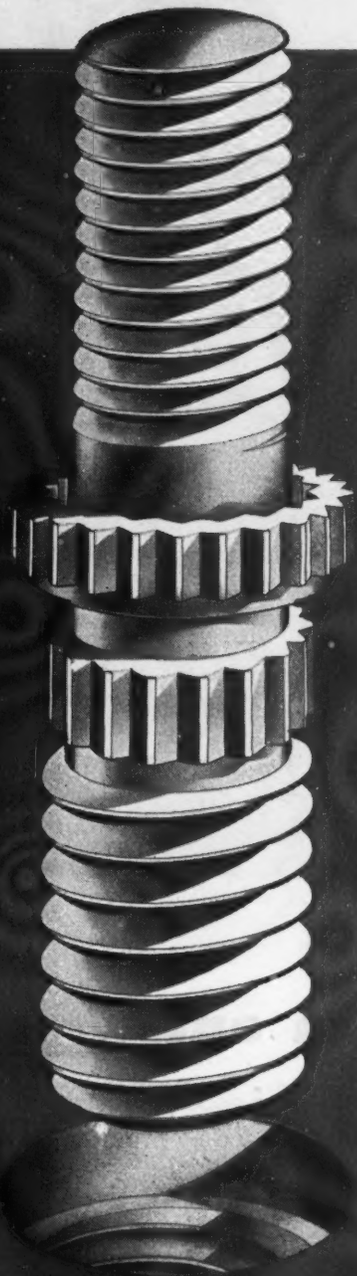
Locked In The Material



THE ROSÁN LOCKED-IN STUD

For Fastening Metal, Plastics and Wood Parts

Rosán Locked-in Studs furnish permanent fastening points in all types of materials. The serrated Locking Ring (see A in illustration) prevents backing out or loosening under vibration or torsion. Installation is permanent, but the units may be removed by a simple shallow drilling operation *without disturbing the parent material.* No oversize replacements necessary, saves repair time and parts storage.

The Ring's the thing

THE ROSÁN LOCKED-IN INSERT

The Rosán Locked-in Insert operates on the same principle as the Stud described above. The serrated Locking Ring, identical in design for both types of units, is used to lock the Insert solidly in any material soft enough for the ring serrations to broach it.

Rosán Locked-in Studs and Inserts have been adapted to the fastening and sealing problems of all types of industry.

WRITE FOR FREE CATALOG
Manufacturers are invited to submit their fastening problems. No obligation.

THE ROSÁN LOCKING SYSTEM

NAVY

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BARDWELL & McALISTER, INC.

EXCLUSIVE LICENSEE

DEPT. 15-45, BOX 1310, HOLLYWOOD, 28, CALIF.

A plan that will benefit veterans, America and you

● You'll be seeing "MEN WANTED" signs on highway, road and street construction jobs all over America when peace comes.

A bill has been passed which authorizes the spending of a billion and a half dollars of federal money on a postwar highway plan. To receive its share of these funds, each state must vote an equal amount of money for the program.

This plan, sponsored by the American Road Builders' Association, will benefit veterans because it is calculated to provide jobs for 3,000,000 men on actual highway construction and for many more in durable and consumer goods industries.

It will benefit all America by providing the modern highways, roads and streets needed for postwar business and recreation.

The plan will help create a prosperous postwar economy by its need for many products.

This vital plan for providing employment for returning soldiers is fully described in an informative illustrated booklet entitled, "THE ROAD AHEAD." Write for your free copy to the American Road Builders' Association, 1319 F Street N. W., Washington 4, D. C.

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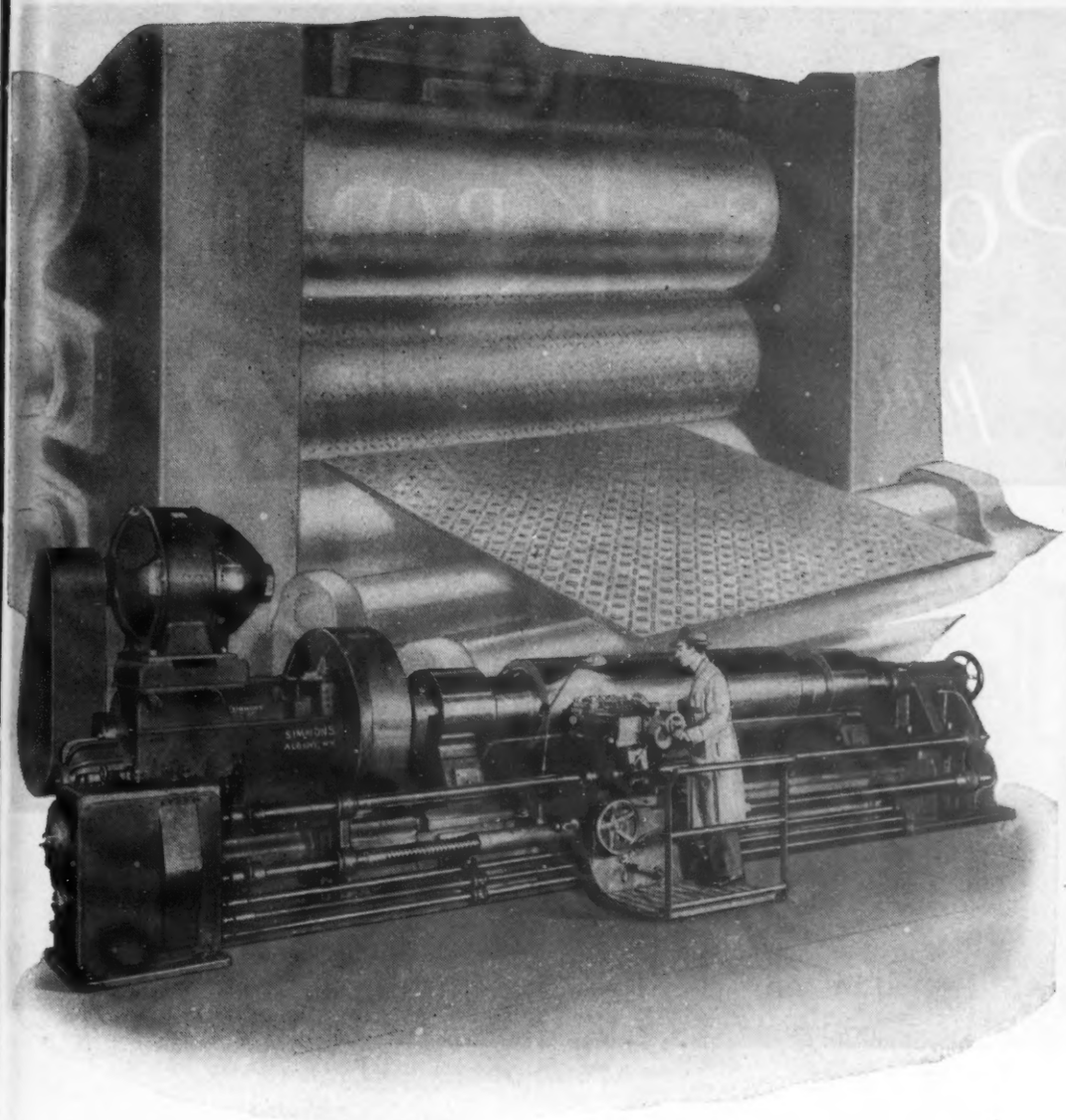


ever see a lathe like this?

Chances are you haven't, since it's the only one of its kind.

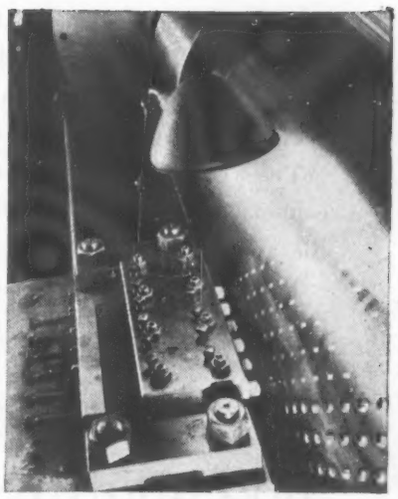
And it has a special job to do for Carnegie-Illinois Steel Corporation... producing accurately spaced pockets in alloy steel rolls which act as dies to form the cleats on U.S.S. Multigrip Floor Plate.

Specially designed and built by Simmons, this lathe, 54″ x 30′, produces six rows of "pockets" in one operation, completing one roll in less than 100 hours! Other machines required 300 hours.

The design and manufacture of special-purpose machines is an important phase of Simmons activities along with *Engineered Rebuilding* and modernizing of machine tools on a service basis and the sale of used tools rebuilt to tested *Engineered Rebuilding* standards.

You'll want to know more about this unusual company. A copy of "The Simmons Way" will take you on a pictorial tour of our plants. Write for it on your letterhead.

SIMMONS MACHINE TOOL CORP., 1755 NO. BROADWAY, ALBANY 1, N. Y.

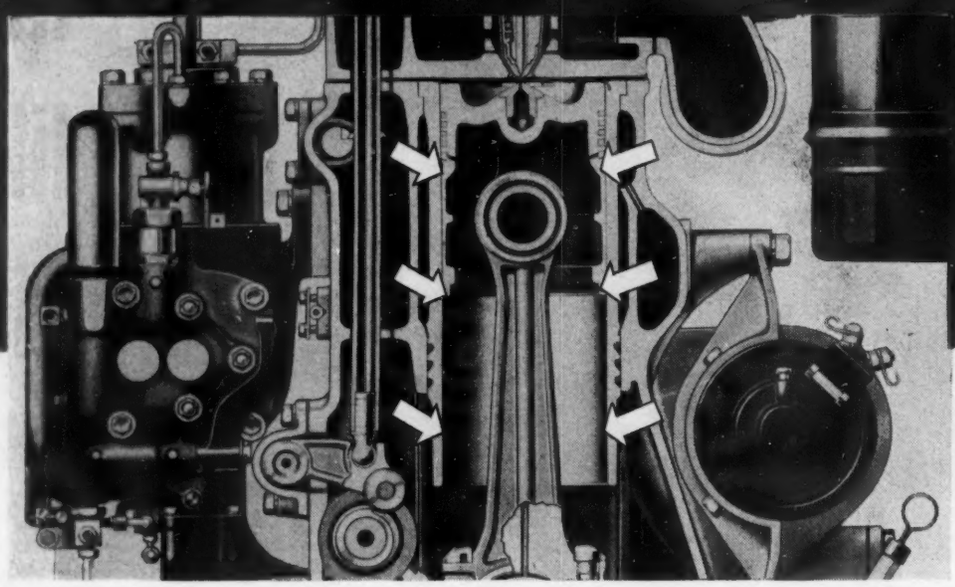


Six cutting tools mounted on tool slide with cam-controlled cross-feed for cutting and relieving action.

SIMMONS MANUFACTURERS OF STANDARD AND SPECIAL-PURPOSE MACHINE TOOLS • ENGINEERED REBUILDING

PORUS-KROME

protects the wear-zone



The greatest wear in Diesel and gasoline engines is on the cylinder walls in the zone traveled by the piston and rings. Corrosion from the products of combustion, and heat, and abrasion, and the difficulty of adequate lubrication all contribute to the rapid wearing of the cylinder wall.

These contributors to short life in cylinder bores cannot be eliminated, but their results can . . . by the application of PORUS-KROME.

PORUS-KROME is hard, pure chromium which is applied to cylinder bores by the patented Van der Horst process. It has tiny pores and channels in its surface which serve as reservoirs for lubricating oil, feeding it back to the surface as needed. It reduces corrosion and wear and multiplies cylinder life 4 to 20 times, and ring life 3 to 4 times.

Experience in actual use confirms test run and engineering laboratory results. Wherever continuous, hard service is required of an engine, PORUS-KROME assures greater engine reliability and lower maintenance costs.

Write today for the complete story of PORUS-KROME and what it will do for *your* engines.

PORUS - KROME

Good for the Life of your Engines

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CHOOSE THE RIGHT WIRE BRUSH FOR YOUR JOB

Free: New *Thor* Bulletin Makes Selection Easy!

Here's a new handy help for you in choosing the right wire brush for your jobs. Tells at a glance the proper types, sizes, styles, capacities and running speeds for top efficiency and maximum economy. Featuring handy, easy to read charts, this new Thor bulletin saves time . . . prevents disappointing results. You'll like the new, simplified pricing system, too. This time-saving bulletin is ready for you. Get your copy today. It's free without obligation.

Thor "top" quality industrial wire brushes can "take it"!

Scientifically constructed for long life on tough jobs, modern Thor wire brushes can be operated efficiently at speeds of 2000 to 6000 r.p.m., depending upon the type of job to be done. The brush sections are heavily filled with doubly durable crimped wire in gauges of from 30 to 36 and can be had in sizes from 4″ to 12″ outside diameter.

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- Proper Type
- Correct Size
- Peripheral Speeds
- Maximum Capacities
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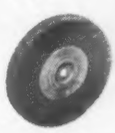
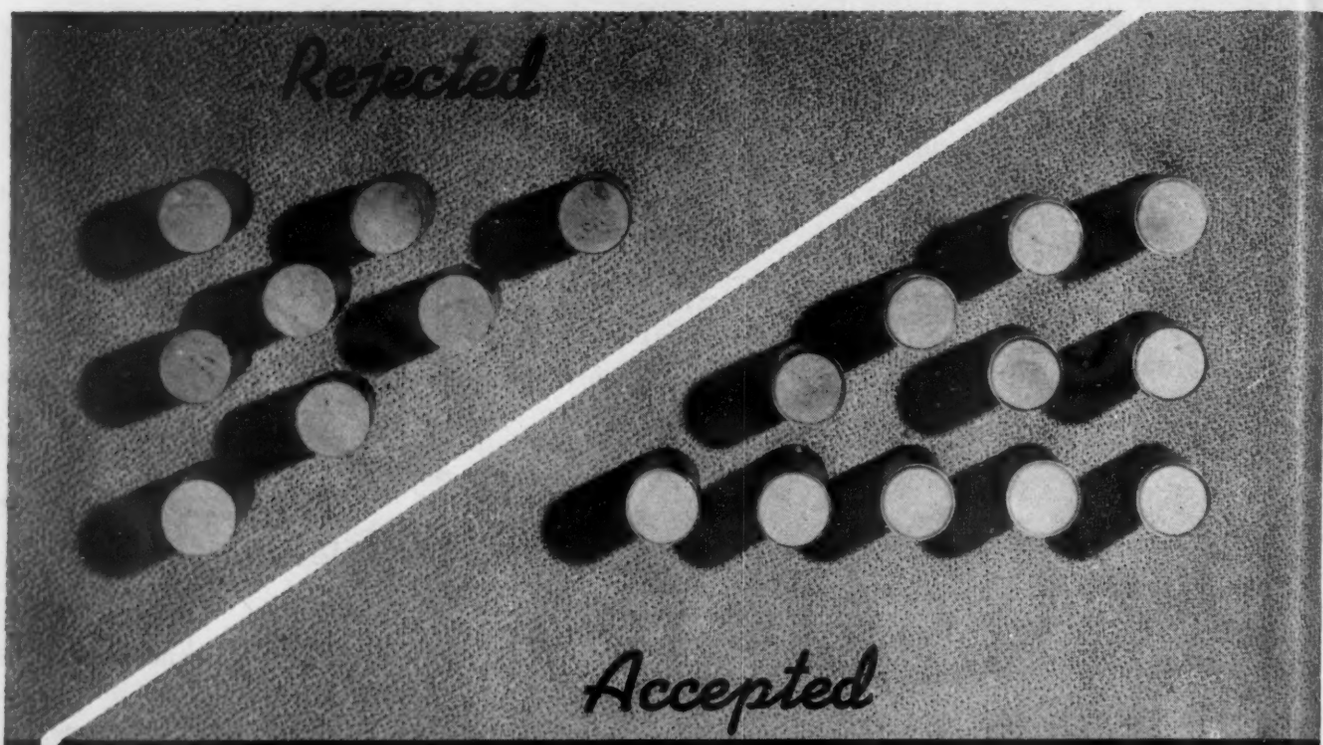

Wire Wheel Brushes

Air Hose Couplings



A PRACTICAL COMPARISON OF CASE DEPTH IN PRODUCTION, WITH THE DuMONT Cyclograph

ARMY E NAVY

These parts have a specified lower limit case depth of .025".

The DuMont Cyclograph sorts these parts into two groups: Group A, case depth less than .025"; Group B, case depth more than .025". This non-destructive, positive, 100% quality inspection has handled several hundred thousand such pieces to date, at a rate of 15,000 per day.

If you are vitally interested in checking case depth on production runs, the Cyclograph may provide that 100% inspection means on a wide variety of shapes and sizes of pieces.

Also, the Cyclograph grades and sorts according to analysis, structure, decarburization, plating or cladding thickness, internal stresses, etc., on ferrous and non-ferrous metals.

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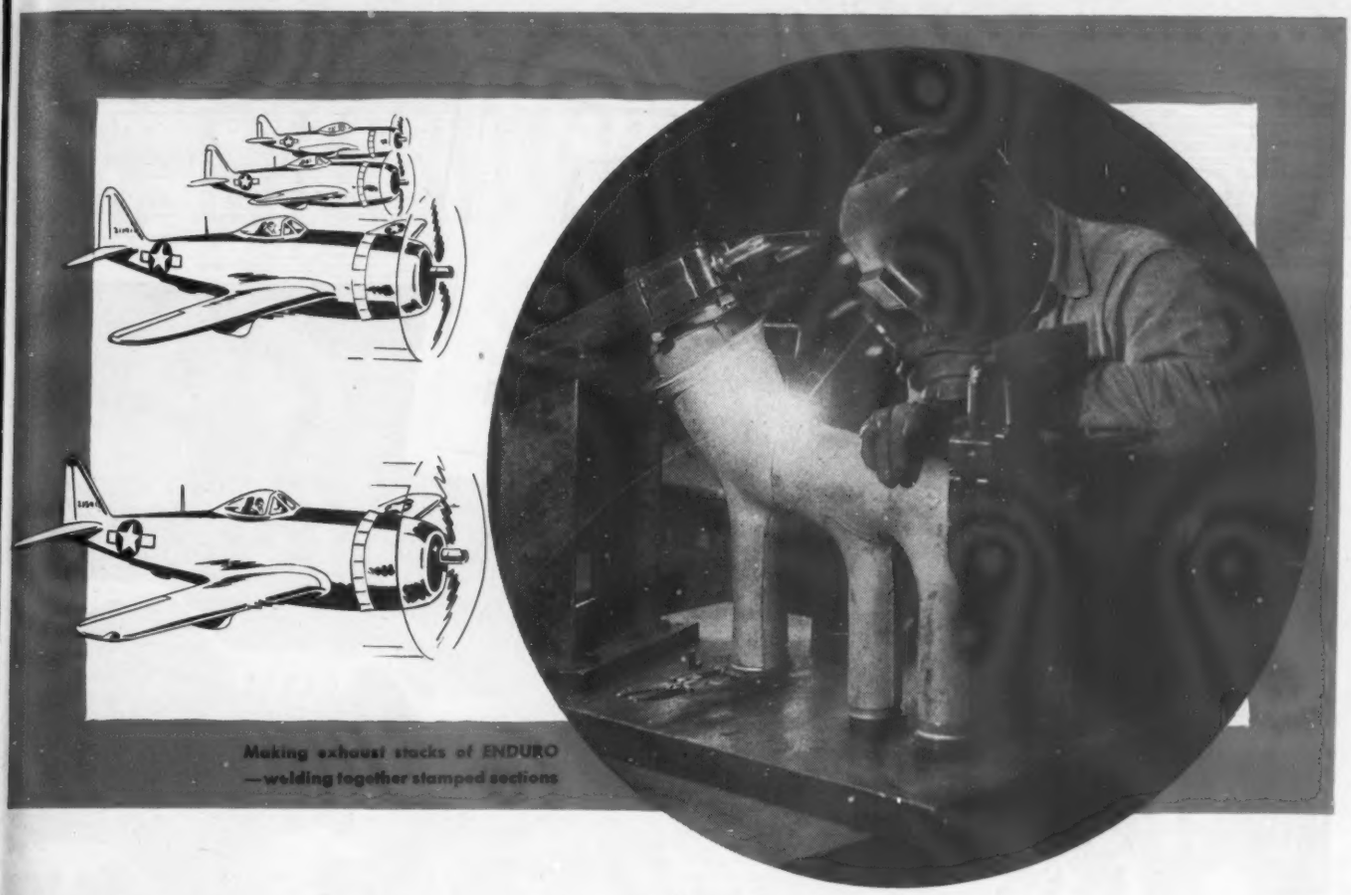

Making exhaust stacks of ENDURO —welding together stamped sections

Stainless Steel "Nostrils"

For Fire-Snorting Warbirds

With a fiery, corrosive exhaust breath of some 1200° F., modern high-powered airplane engines put legendary dragons to shame.

But destructive exhaust gases must be safely carried away from plane and pilot—and, in many instances, harnessed as power to drive a supercharger.

For that purpose, Republic ENDURO Stainless Steel is unequalled. Its extreme resistance to heat and corrosion combines with unusually high strength to insure safety, light weight and long life for exhaust stacks—the engine "nostrils"—and even for complete exhaust systems of thousands of our victory-winning warbirds.

ENDURO is one of the Republic Electric Furnace Steels—and, as such, is one of the finest steels possible to produce today.

Republic Electric Furnace Steels are "targeted" steels—accurately aimed at product and processing specifications and rigidly held to that mark by the close control possible only in electric furnace melting.

They are consistently UNIFORM—in physical, chemical, hardenability and performance values. They are as SOUND and CLEAN as steel can be made. And they are remarkably free from those small imperfections which can cause rejection at final inspection and prove so costly to manufacturers of items in which labor and machine costs are extremely high in proportion to material cost.

Republic—world leader in electric furnace steels—is ready to tell you NOW how you can use these steels as low-cost insurance of high product quality—and how their freedom from practice-upsetting variables can help you derive maximum benefits from mass production methods of manufacture. Write today to:

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—Leader in the Production of
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"QUALITY" steels . . . alloy . . . stainless

Galvanized Metal Buildings for Troops in Iceland

★ In every part of the world today, galvanizing, or zinc coating, protects our fighting men and equipment . . . for the U. S. Bureau of Standards has pronounced zinc "by far the best" metallic coating for the protection of iron and steel against rust. Tomorrow zinc will play an equally important part in the protection of America's peace-time products.

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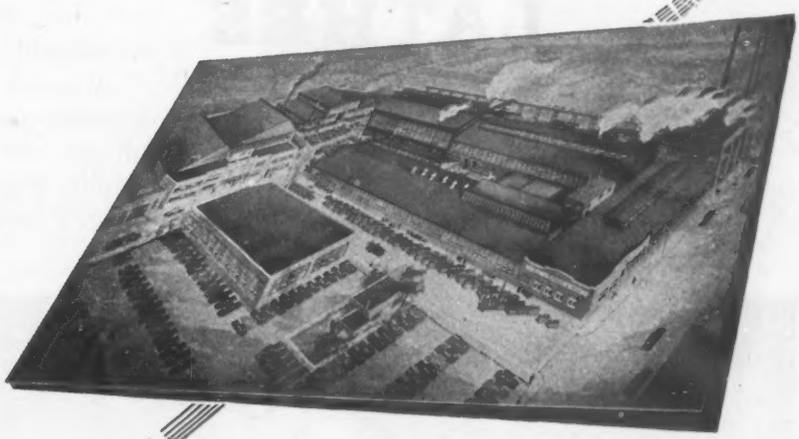
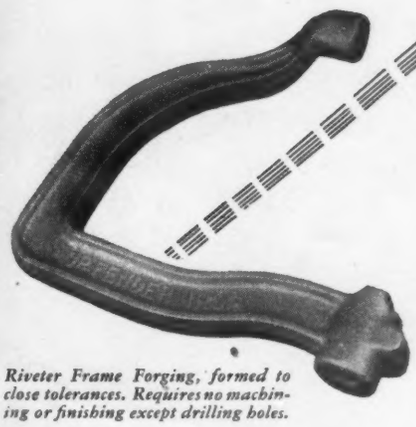
One purpose . . .

the IMPROVEMENT of Metals



Here the most modern forging and heat treating equipment is being utilized, under the direction of highly skilled executives and technicians, to obtain volume production of forgings for the war effort, and to make available for the peace to come high quality forgings for every industrial use.



Riveter Frame Forging, formed to close tolerances. Requires no machining or finishing except drilling holes.

by Forging

Even in a part of simple design, there may be a vast difference in the degree of *metal quality* developed by forging. A high degree of *metal quality* is of great importance in forgings subjected to severe stress and shock in actual service. *Metal quality* is inherent in the metal, but The IMPROVEMENT OF METALS BY FORGING determines the degree of *metal quality* of the forging assembled into your product. *Employing the most suitable forging technique develops metal quality fully.* Ask a Steel Improvement Forging Engineer, who is backed by 31 years of technical forging production effort, about the development of *metal quality* for the parts you use.

Reference Data Booklet presents many new ideas on forgings and their applications in many different types of equipment. Copies available to engineers, metallurgists and executives.

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THE STEEL IMPROVEMENT & FORGE CO.

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for Close Limit Precision Machining

When unpredictable precision jobs tax toolroom facilities, South Bend Toolroom Lathes help keep the work going smoothly. Their superior design and careful workmanship make close limit toolroom work easier. Their smooth power and rugged construction make them equally popular for exacting production operations.

Versatility is often as important as accuracy. The ease with which set-ups can be changed for numerous precision operations, plus wide ranges of spindle speeds, threading, and power turning and facing feeds effectively contribute to their efficiency. Many attachments are available for special classes of work.

Whether your problem is precision toolroom work, or production machining to toolroom standards, get the full story of South Bend Toolroom Lathes. They will simplify your work. Made in five sizes, 9″ swing to 16″ swing. Write for New Catalog No. 100-D.

SOUTH BEND 16" TOOLROOM LATHE

SPECIFICATIONS

SOUTH BEND 16" TOOLROOM LATHE

Swing Over Bed . . . . . 16¼"
Maximum Collet Capacity . . . . . 1"
Bed Lengths . . . . . 6′, 7′, 8′
Spindle Speeds (8) . . . . 21 to 725 r. p. m.
Thread Cutting Range (48) . 4 to 224 per in.

TRAINING HELPS

Sound films, operator's handbooks, booklets, wall charts, and bulletins on lathe operation and care are available for training new lathe operators. Write for Bulletin No. 21-D for full information.

Lathe Builders For 38 Years

SOUTH BEND LATHE WORKS

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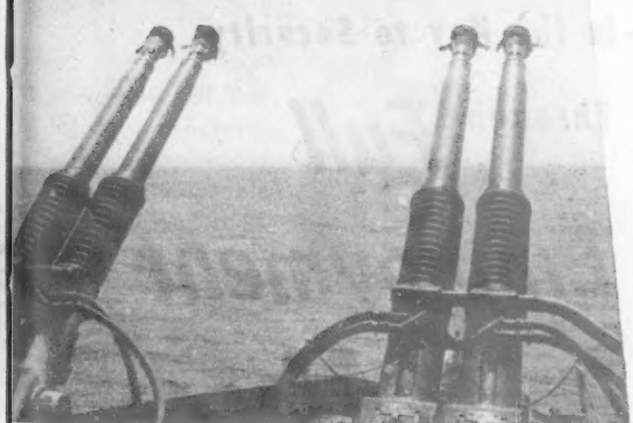
Approximately fifty per cent of the valve-spring wire used by Allied air forces is produced by Washburn

Washburn wire plays a vital part in the machine guns and small arms of the Allied armed forces throughout the world

The Bofors gun is another weapon of war whose performance is enhanced by the uniformly high quality of Washburn products



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Washburn is proud of its achievement of meeting military demands for top quality steel . . . proud of its ability to produce steel equal to that imported to this country prior to the war!

WASHBURN WIRE CO.

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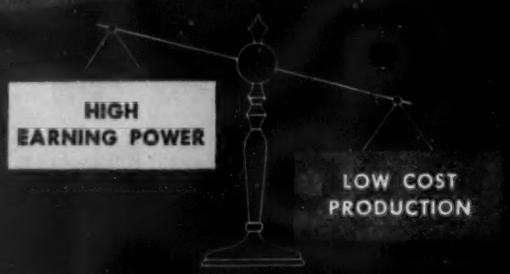
Clean, Uniform Billets - Strip - Rectangular, Round and Flat Rods - Tempered and Untempered Flat and Round High Carbon Wires.

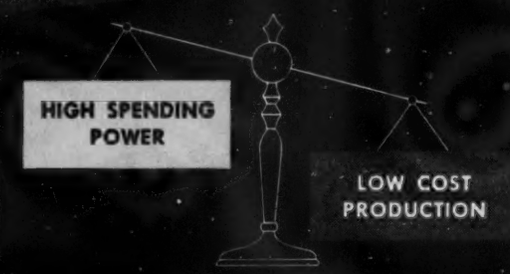
Everybody and Every Company Has TWO BASIC POWERS—

EARNING POWER

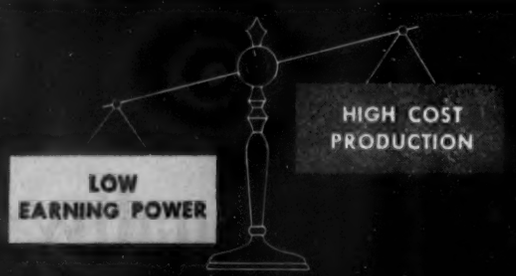


High earning power brings high volume demand for goods—stimulates efficiency, increases unit production, resulting in lower cost production.

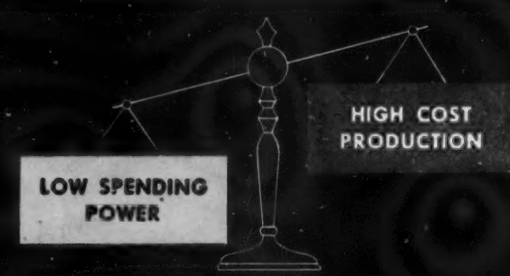
SPENDING POWER



High spending power brings lower cost production because it stimulates keener competition and the use of efficient machinery and methods. Low cost production means more goods—higher standards of living.



Low earning power can lead only to lowered efficiency and high cost production because it means diminishing demand for goods, low volume, less efficient production.



Low spending power causes higher cost production, because the lower demand for goods makes it impossible to take full advantage of the making of more goods at lower cost.

SPENDING POWER—Is the Key to Security Through Full Employment

Dollars . . . in any quantity at any time . . . are beneficial only when they are in use . . . being spent. Dollars in use . . . being spent . . . provide jobs . . . security . . . prosperity . . . higher standards of living.

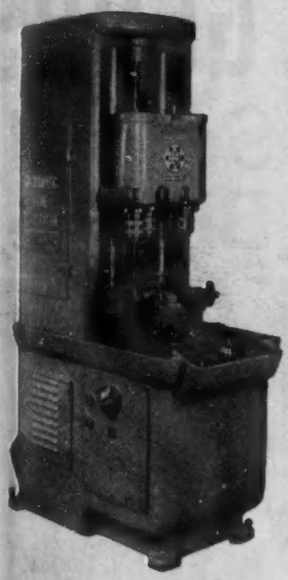
Obviously, individual spending power depends on each man's earning power . . . and his earning power can increase only as he is enabled to produce more. Only when the individual earns more and spends it . . . can companies produce more . . . earn more . . . hire more and spend more.

The only post war plan that any of us can depend upon is to increase production per man per hour so that everyone can earn more, spend more, have more goods and a higher standard of living.

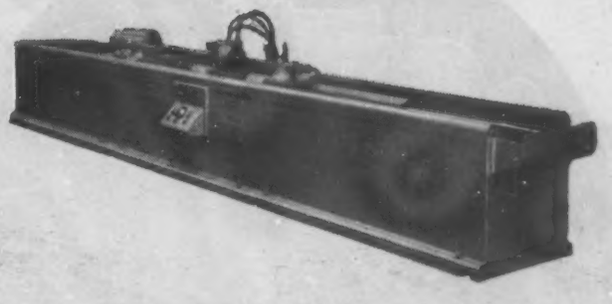
MICRO MATIC

MICROMATIC

MAKERS OF



Micromatic Model 705 Multiple Spindle Vertical Hydrohoner Machine with built-in automatic Microsize Control. For internal honing. Rotary indexing work table provides high production. Usually recommended for maximum stock removal ranging from .0005″ to .0015″ on hardened parts—.001″ to .010″ on soft or medium hard. Bores from ¼″ to 2″ diameter. Microsize control gauges work automatically. Work is held uniformly within tolerance of .0003″. Honing cycle is automatically stopped when correct size is reached.

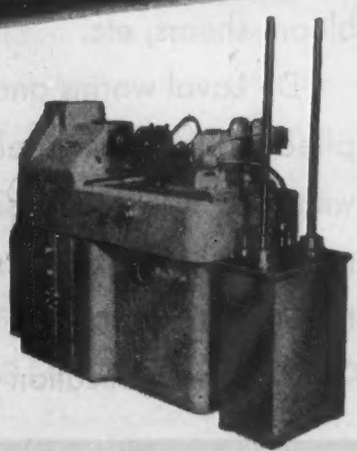


Micromatic Horizontal Floor Type Hydrohoner for internal or external honing. Tool operates either under hydraulic or manual control. Tools available to generate either crosshatch or co-directional finish patterns. Full floating tool action. Stock removal .0015″ to .002″—precision generated size limits .0003″. Corrects error for taper to within .0001″ limit. Size of work accommodated 1″ up.

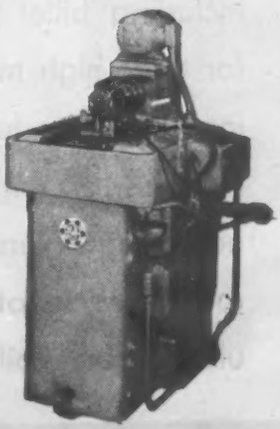
THESE MACHINES NOW ON WAR WORK *Will Add to* SPENDING POWER WHEN PEACE COMES

By Producing MORE GOODS at LOWER COST

Micromatic Model 702 Vertical Hydrohoner Machine. Standard single spindle type—built for rapid production honing of bores or cylindrical surfaces up to 2″ in diameter.



Micromatic Ball Stud Honer—generates precision sphericity without measurable error on ball studs. Removes .030″ stock on diameter from turned heat treated forging.



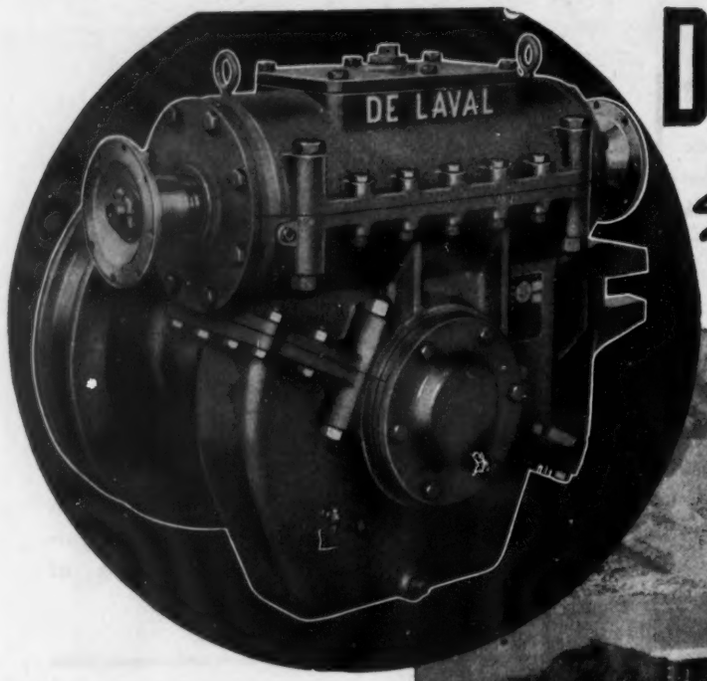
Micromatic Horizontal Honer working on production honing of silver plated bearings. On this non-ferrous honing job the Micromatic Machine reduced costs 50% from previous methods.

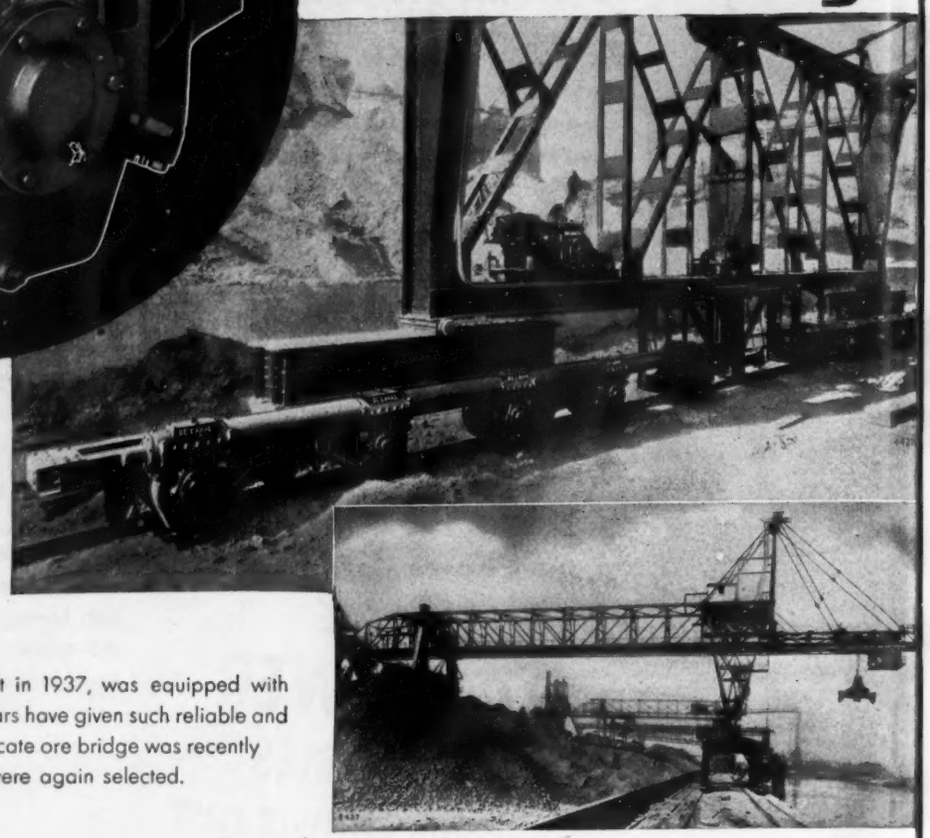
HONE CORPORATION

DETROIT 4, MICHIGAN

HONING MACHINE TOOLS

DE LAVAL GEARS *Specified for* Second Ore Bridge





This 10-ton ore bridge is propelled along the waterfront by four 33-h.p. motors driving the individual traction wheels through 32 De Laval 40-ratio Worm Gears. There are also two 8½-h.p. motors operating clamping drives through De Laval 24½-ratio Worm Gears.

The ore bridge here illustrated, built in 1937, was equipped with *DE LAVAL WORM GEARS*. These gears have given such reliable and excellent service, that when a duplicate ore bridge was recently ordered De Laval gears were again selected.

DE LAVAL gears are widely used on blast furnace and steel mill equipment, including billet pushers, catcher tables for three-high mills, coal crushers, cooling table transfers, crane trolleys, draw benches, edging rolls, fan drives, furnace door lifters, hot beds, heavy-duty roll lathes, ingot buggy drives, manipulator tables, piler tables, plate shears, roll grinders, screw-downs, steel wire fabricating machines, straighteners, up-cut bloom shears, etc.

De Laval worms and gears are supplied either separately or complete with bearings and casings. Our engineers will gladly assist in solving transmission problems.

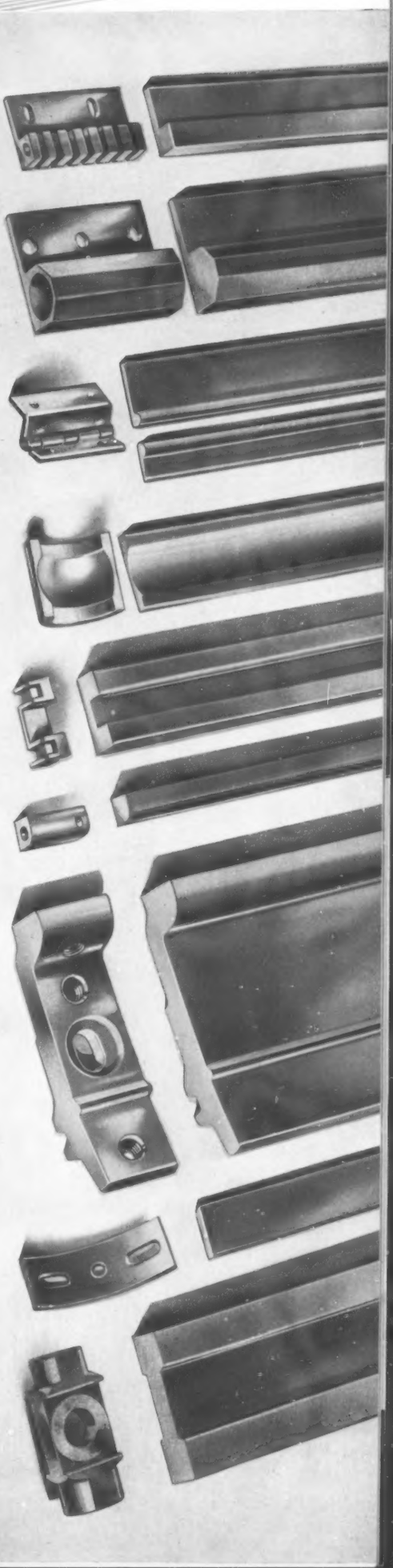
Ask for Publication W-1135.

DE LAVAL WORM GEAR DIVISION

of the De Laval Steam Turbine Co., Trenton, N. J.

MANUFACTURERS OF TURBINES STEAM HYDRAULIC PUMPS CENTRIFUGAL PROPELLER ROTARY DISPLACEMENT MOTOR MOUNTED MIXED-FLOW CLOGLESS SELF-PRIMING CENTRIFUGAL BLOWERS and COMPRESSORS GEARS WORM HELICAL and FLEXIBLE COUPLINGS

Who pays for the chips?



Hogging out unnecessary metal from flat bars to arrive at a complicated or irregularly shaped part is costly from every point of view. Collecting, grading and disposing of the chips is the least of it—far more important is what they represent . . . loss of man and machine-hours, wasted metal, power and cutting tools.

Through the design and production of Anaconda Extruded and Drawn Shapes, The American Brass Company endeavors to furnish the metal working industries with copper and copper alloys as near as possible to the size and shape of the finished product.

All of the Anaconda Shapes illustrated at the right were supplied in long mill lengths to leading manufacturers in widely diversified fields. The finished components—each a precision part made to close tolerances—are shown ready for assembly. Estimate the time, material and cost saving possibilities of such shapes in terms of your own product.

And remember that these are *wrought* shapes, produced by extruding, drawing or rolling to consistently accurate dimensions. They machine readily and are made of Anaconda Copper, Brass, Bronze and a wide range of Special Copper Alloys.

THE AMERICAN BRASS COMPANY

ANACONDA
from m[illegible] to [illegible]sumer
REG. U.S. PAT. OFF.

General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

Extruded & Drawn Shapes

screw machine products are born tattle-tales

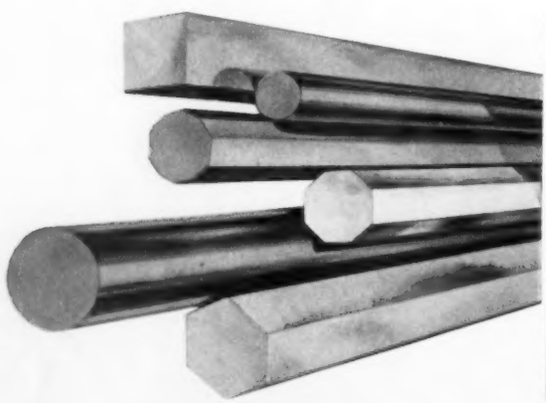
A finished part drops into the pan every few seconds—and each one carries tell-tale evidence on the accuracy of the setup, the condition of the cutting tools and the machinability of the rod stock.

The machining characteristics of the rod are especially important on parts such as those illustrated—where threads must be full-formed and clean-cut, knurls well defined, with turned surfaces and reamed holes mirror-smooth.

Many shops depend exclusively on Anaconda Free Cutting Brass Rods to meet such requirements day after day. These rods are consistently uniform in composition, temper and dimensions—mighty important qualities to those who make, buy, sell, or use screw machine products. 45156

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*



The American Brass Company produces a large number of Copper and Copper Alloys in rod forms, and in all commercial sizes and shapes suitable for screw machine use. Their composition, properties and machinability ratings are listed in Anaconda Publication B-14. A copy will be mailed on request.

ANACONDA

Anaconda Free Cutting Rods

●THE LIMITROL COMPARATOR ROLL THREAD SNAP GAGE by WOODWORTH has proven its *efficiency* and *utility* in hundreds of war plants for many months under the pressure of war production. The LIMITROL has proven that it will reduce effectively your inspection costs by combining greater *speed* with greater *accuracy.*

The LIMITROL *checks* errors involving pitch diameter, lead, taper, angle, out-of-roundness and straightness. Also supplied with rolls to check plain parts. It eliminates "feel" and reduces scrap. *Write for your copy of the Limitrol Catalog No. 44-L.*

ACCURACY YOU W CAN TRUST

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8 Superior Features

OF GRANITE CITY SUPERBOND STAINLESS-CLAD STEEL

Permanent Bond

After 10 years of experience Granite City Steel Company has obtained a permanent bond that allows no separation of clad even after fracture or severe bending.

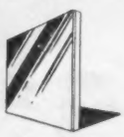
Greater Heat Diffusion

SUPERBOND'S mild steel backing rapidly and uniformly dissipates heat with 8 times the conductivity of solid stainless steel. For retorts—kettles.

Easily Formed

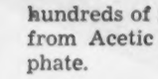
SUPERBOND Stainless-Clad Steel is easily formed, drawn, punched, beaded and fabricated. You can use the same presses and dies for mild steel.

Economy



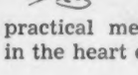
The mild steel backing to the stainless steel gives your products the added sales value of stainless quality at much reduced costs.

Corrosion-Resistant



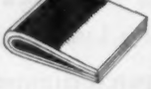
Its bright, stainless steel surface that won't rust or tarnish, offers corrosion resistance to hundreds of reagents that range from Acetic Acid to Zinc Sulphate.

Tailor Made



Steel to perfectly fit *your* job is guaranteed by the new and modern laboratory, run by practical metallurgists, located in the heart of the mill.

Strength



The tensile strength is as high or higher than the proportionate strength of the two metals. Withstands cold bending through an angle of 180°.

Service

Granite City Steel Company is built to serve customers. Large enough to have modern equipment and methods—small enough for fast, accurate service.

SUPERBOND STAINLESS-CLAD STEEL HAS HUNDREDS OF USES

Acid Tanks • Tubs
Conveyors • Chemical Kettles • Drums • Stills
Fume Stacks • Linings
Pressure Vessels • Tank Cars • Cooking Utensils
Sinks • Cabinets
Storage Tanks of all kinds
Laboratory Equipment
Building Fronts and Trims • Fountain and restaurant equipment
Truck Bodies • Bumpers
Accessories

Granite City Steel Company

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1878

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Send for this Booklet

which contains complete information and technical data on SUPERBOND Stainless-Clad Steel.

HOT ROLLED SHEETS • COLD ROLLED SHEETS • STRIPLATES • STAINLESS-CLAD • TIN PLATE • TERNE PLATE • ELECTRICAL SHEETS • TIN MILL PRODUCTS • PORCELAIN ENAMELING SHEETS

HEAT PROVER...QUICKLY REVEALS INCOMPLETE COMBUSTION

FREE Demonstration Test Will Help Solve Your Combustion Problems . . . Conserve Fuel . . . Increase Quantity and Quality of Your Product.

Today, like many engineers in both small and large industrial plants, you very likely want to know—*by accurate measurement*—the answers to these four vital problems:

1. **Just how efficiently do my boilers burn fuel?**
2. **How efficiently do wartime operators control them?**
3. **What have wartime overload conditions done to normal fuel economy?**
4. **And what, actually, is the status of my combustion control equipment?**

To all these questions—and more—Cities Service has the almost perfect answer in the Cities Service INDUSTRIAL HEAT PROVER. This unique instrument quickly analyzes combustion . . . accurately determines degree of fuel waste due to air deficiency or dilution. Thoroughly tested on practically every type of combustion equipment in this country and with every kind of fuel, the Industrial Heat Prover already has been adopted by users of steam power plants, open hearth furnaces, cement kilns, heat-treating apparatus, crucible furnaces and internal combustion engines. And for a very good reason.

Accurate combustion analyses made as a result of the Cities Service Industrial Heat Prover tests have effected considerable savings in fuel costs...reduced repairs and replacements on furnace linings, crucibles and refractories due to flame corrosion... and have led to increased production of better and more uniform products.

Why not get a Cities Service Industrial Heat Prover Test in your own plant? You may have it *without cost or obligation*—if you will simply mail the coupon at right. A Cities Service Engineer will then make an Industrial Heat Prover Test in your plant—at your convenience. Mail the coupon—today.

THE CITIES SERVICE INDUSTRIAL HEAT PROVER—a new, accurate combustion analysis instrument developed by the Cities Service Research Division enables those engaged in the oxygen control of furnace atmospheres to achieve greater combustion efficiency at less cost.

(This offer is available only in Cities Service marketing areas EAST of the Rockies.)

CITIES SERVICE OILS — ONCE-ALWAYS

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Room 275
Sixty Wall Tower, New York 5, N. Y.

Gentlemen: Please arrange a Cities Service Industrial Heat Prover Test for my plant. I understand there is no charge or obligation for this service.

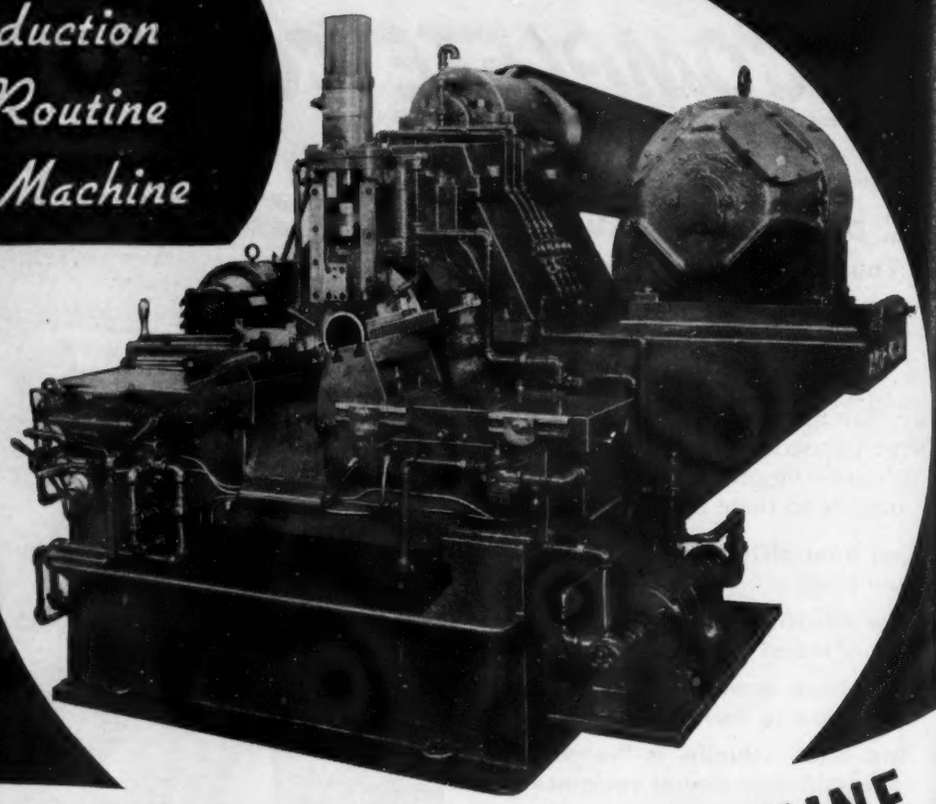
Name.....

Title.....

Company.....

Address.....

High Production is Daily Routine with this Machine



Range of Sizes
1" to 24" in Diameter

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Accurate at All Speeds

When production demands are bearing down it is good to know that Taylor-Wilson Machines can absorb the extra load without showing strain or loss of efficiency. Over-built and rugged in construction they stand up under continuous high speed with watch-like precision. No vibration — no breaking of parts — just trouble-free smoothness. Now turning out prodigious volume in many war production plants in such vital work as crop ending, cutting off pipe or tubing for coupling stock, roller bearing blanks, bomb blanks and other set lengths.

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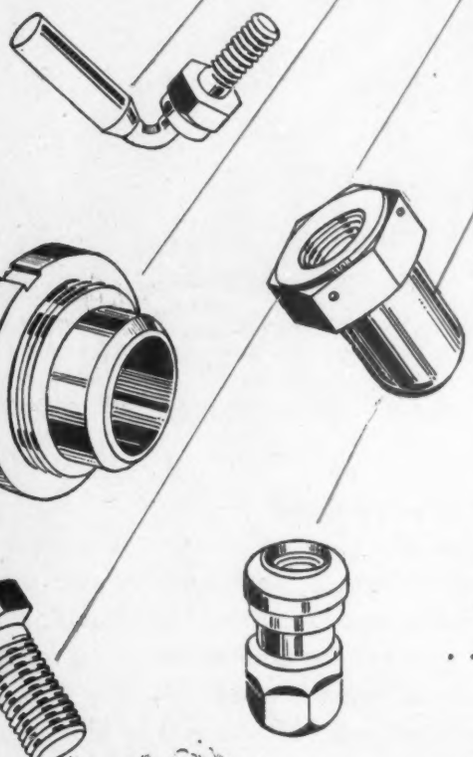
WE ALSO MANUFACTURE

Straightening, Burnishing and Sizing Machines, Galvanizing Equipment for Pipe, Small Seamless Tube Mills, Tube Testing Machines, Test Benches, Butt Weld Pipe Mills and Complete line of Equipment for the finishing of pipe.

TAYLOR-WILSON MANUFACTURING CO.
Thomson Ave., McKees Rocks, Pa.
(Pittsburgh District)

SKILL . . .

IN ENGINEERING AND PRODUCTION WORKS FOR YOU AT TOUREK!



It is our business to work for you—to produce screw machine products which fully meet your exact specifications. To do this, we have fully coordinated the vital factors of *engineering "know-how". . . . modern equipment . . .* and *manufacturing experience!*

Precision? Why, it has been a "must" at Tourek for twenty-five years.

Why not consult us *now* about your post-war requirements for screw machine products? All our skill in engineering and production is available to produce for you . . . in any quantity . . . in any alloy . . . and in any size up to 2 5/8".

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MAKERS OF THE FAMOUS TOUREK BALL JOINTS

ESTABLISHED 1920

TOUREK

PRECISION SCREW MACHINE PRODUCTS

Dipped in Molten Zinc

FOR THE UTMOST IN RUST PREVENTION

"I predict that the most certain major changes in greenhouse construction will be the universal use of Hot-Dip Galvanizing to prevent the need of maintenance."

T. E. KING, *Vice President*
LORD & BURNHAM COMPANY

Two examples of steel constructed greenhouses by Lord & Burnham Co., Designers and Builders of Greenhouses since 1856 . . . Hot-Dipped Galvanized throughout for protection from weather and condensation.

Day after day more new users are anticipating longer life and greater uninterrupted service for their products and installations by specifying Hot-Dip Galvanizing.

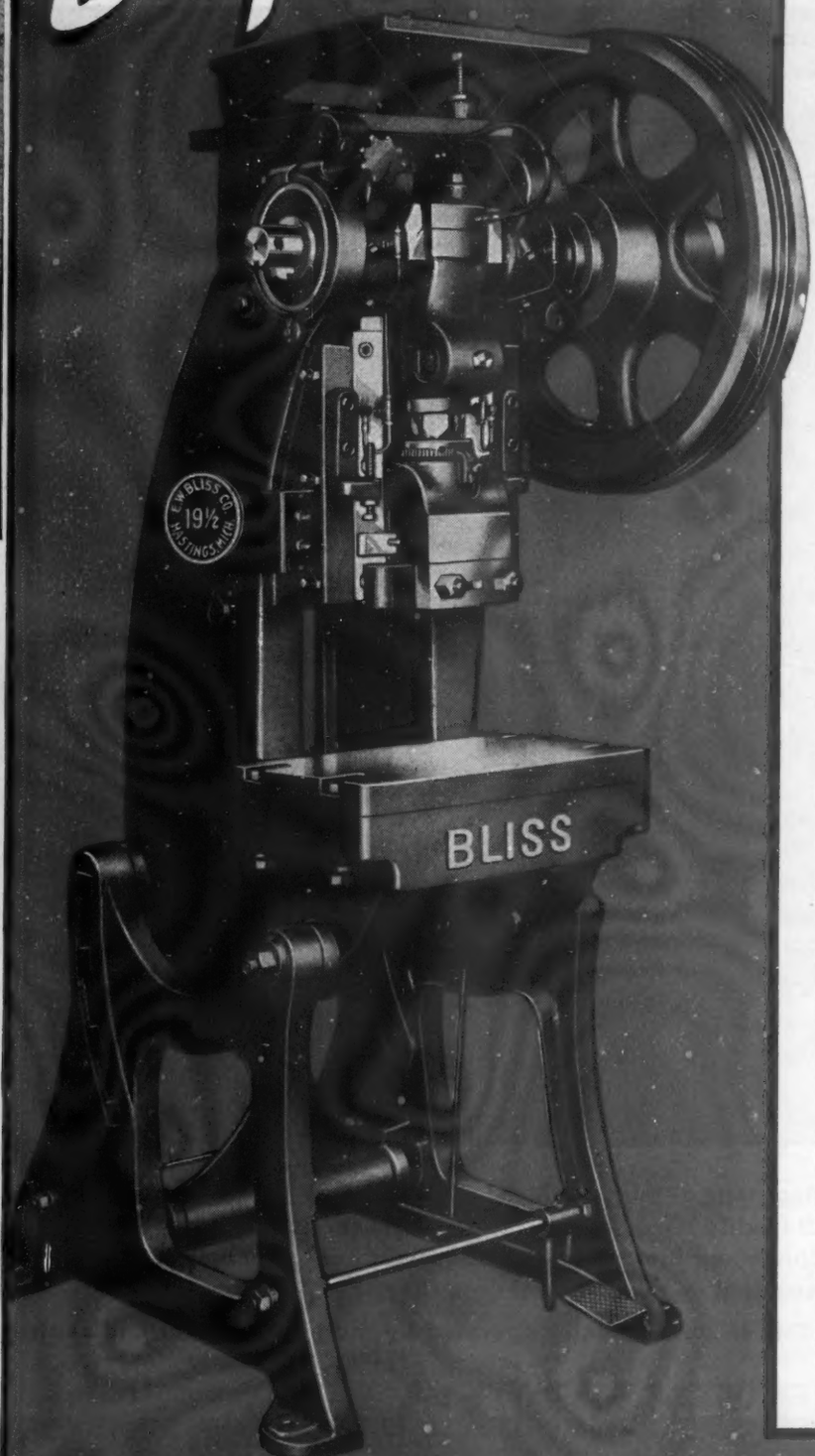
Thousands of installations mutely testify that the definite fusion of molten zinc with the base metal —through the Hot-Dip Galvanizing Method, increases the life of iron and steel products and installations—years and years beyond their normal expectancy. This process has saved users millions of dollars in expensive maintenance and replacement costs.

If the life of your products is menaced by corrosion—here is the solution to your problem. Conclusive tests have proved that Hot-Dip Galvanizing provides *the utmost in rust prevention.*

There is a member of the Hot-Dip Galvanizers Association near you who will be glad to discuss rust and corrosion prevention—for his name and address write: American Hot Dip Galvanizers Association, Inc., First National Bank Building, Pittsburgh 22, Pennsylvania.

For the best Zinc Coating use hot-dip GALVANIZING

Dependability Plus!



FORTY YEARS is not an unusual lifetime for a Bliss Inclinable Power Press. Bliss Service Departments are called on regularly to replace parts of "old timers" still contributing valuable service to industry. Experience and research have resulted in many modern refinements which provide a "plus" feature to press users. Consider the distinctive features of the Bliss design next time you are interested in new press equipment.

12 of the Reasons Why You Should Buy Bliss Inclinable Presses

1. Fast acting Rolling Key Clutch simple in construction yet powerful and dependable in operation. Dependable Bliss Pneumatic Friction Clutches on larger presses.

2. Frames are cast of high test iron for rigidity, better wearing qualities, and shock absorbing properties. Designed with a high factor of safety.

3. Bronze Bushings in main and connection bearings.

4. Non-split plug type connection. Long adjusting screws locked tight by wedge-like sections. Adjustable ball type connection screw cap to eliminate back lash.

5. Slides designed for convenience in setting dies. Punch stem held positively by non-tilting accurately fitted clamping cap. Long, precision ground gibbing for perfect alignment.

6. Single tripping or continuous operation obtained by transferring point of contact of treadle rod.

7. Automatic or semi-automatic lubrication assures proper flow of lubricant thereby maintaining smooth press operation.

8. Adaptability to a wide variety of uses makes the open back inclinable press indispensable to most stamping shops.

9. Drawing operations on shells are greatly simplified by easily installed Bliss "Marquette" die cushions.

10. Variety of automatic feeds and accessory equipment of Bliss design to speed production.

11. High finish and precision fitting at the vital spots insure long life.

12. Twenty-one standard sizes available in capacities from 10 tons to 200 tons.

E. W. BLISS COMPANY

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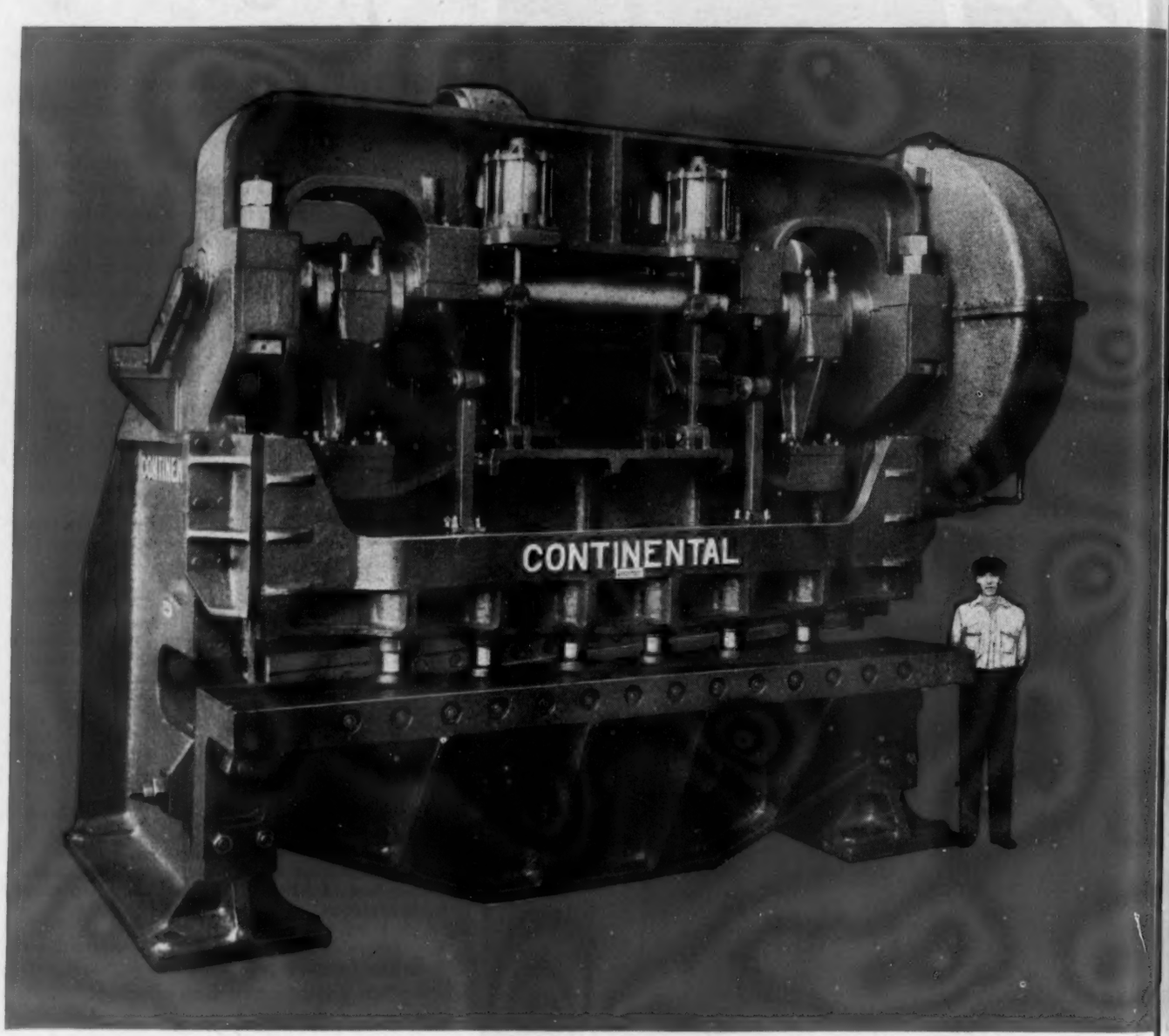
E. W. BLISS COMPANY OF CANADA, LTD., TORONTO, ONTARIO, CANADA

CONTINENTAL
PLATE SHEAR



All operating parts of this new Plate Shear are visible and accessible. Crank Shaft readily removed vertically without threading through housings. Air Disc Clutch and Brake eliminate the major portion of maintenance normally required on conventional type shears.

Patented Gag is mechanically operated by individual motor and control.

CONTINENTAL
FOUNDRY & MACHINE COMPANY
CHICAGO • PITTSBURGH

CHICAGO WORKS	PITTSBURGH WORKS	WHEELING WORKS	WARWOOD WORKS
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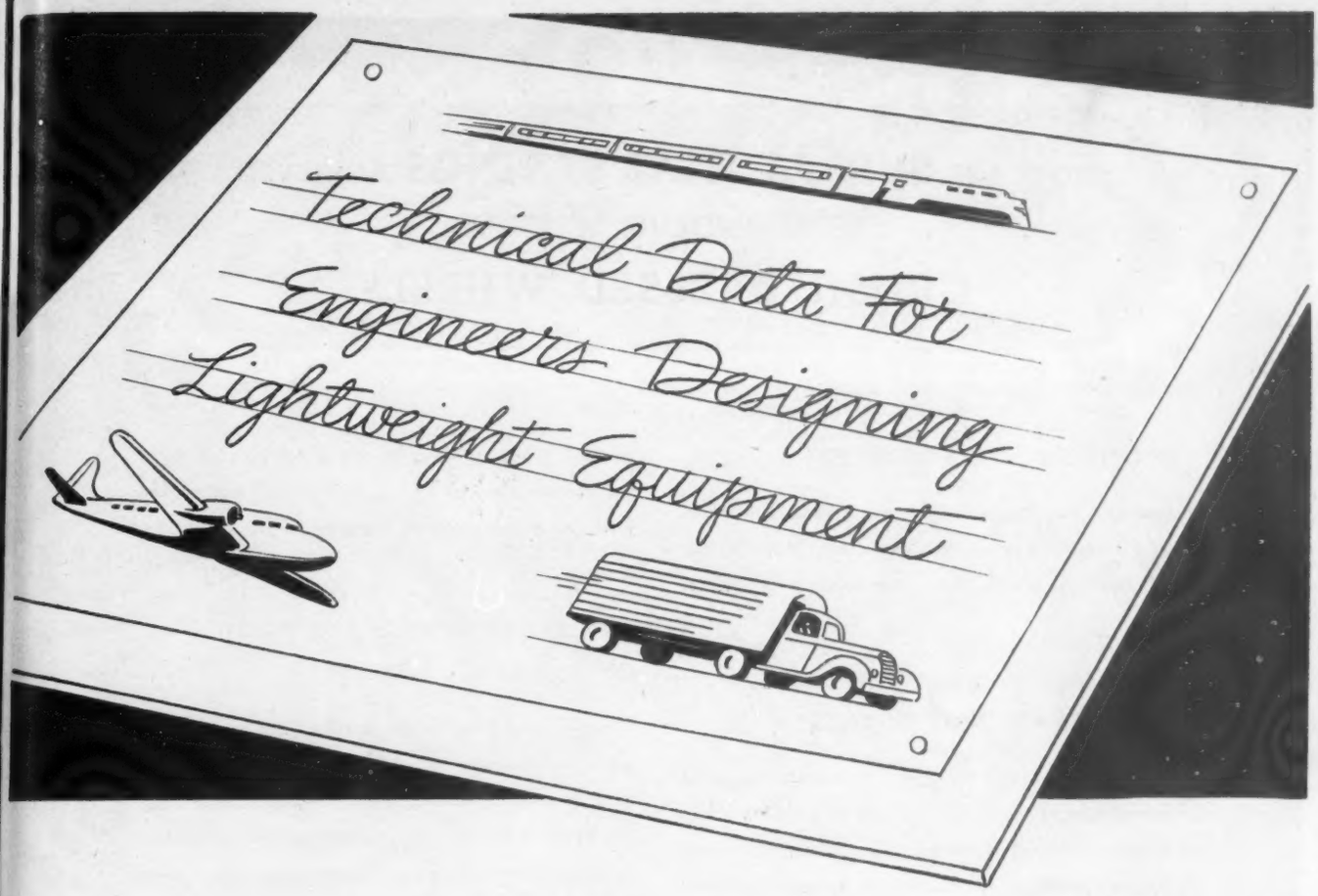

• You can get much useful information on the physical properties of the high-strength cold-rolled austenitic alloy steels by writing for the technical publications listed below.

All these papers are based on studies made at the research laboratories of Electro Metallurgical Company, and are part of a broad development program to find new or improved ways of using stainless and other alloy steels and irons.

Buy United States War Bonds and Stamps

"The Stress-Strain Characteristics of Cold-Rolled Austenitic Stainless Steels in Compression as Determined by the Cylinder Test Method" — describes a method for determining compressive strength of thin sheets of these steels; it is illustrated by curves from the tests on typical grades of stainless steel.

"Effects of Low-Temperature Heat-Treatment on Elastic Properties of Cold-Rolled Austenitic Stainless Steels" — a 16-page paper, illustrated by charts and graphs, on the results of various low-temperature heat-treatments on the mechanical properties of cold-rolled austenitic stainless steels.

"High-Manganese Austenitic Steels" — physical data on new high-strength steel, for possible use in aircraft construction and in other lightweight structures.

"Tension and Compression Stress-Strain Characteristics of Cold-Rolled Austenitic Chromium-Nickel and Chromium-Manganese-Nickel Stainless Steels" — a compilation of important physical data on austenitic chromium-nickel and chromium-manganese-nickel steels.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
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HOW ARE SUBSTANTIAL SAVINGS ACHIEVED BY GRINDING WITH A CRUSH DRESSED WHEEL?

IS GRINDING TIME REDUCED?

Yes! On the Sheffield Precision Thread and Form Grinder with a crush dressed multi-ribbed wheel, grinding time is often reduced as much as two-thirds.

DOES CRUSH DRESSING PROVIDE A BETTER CUTTING SURFACE?

Yes! Crush dressing removes whole grains from the wheel leaving a multitude of effective cutting edges whereas diamond dressing cuts across the grains leaving flats which do not cut but do increase generation of heat.

IS CRUSHED WHEEL DRESSING FAST?

A full form can be crushed into a wheel on the Sheffield Precision Thread and Form Grinder by the special crushing device, in a fraction of the time required by conventional dressing methods. Intricate profiles requiring hours by diamond dressing, can be crushed into a wheel in a few minutes. After the original crushing of a wheel, recrushings or redressings take only a few seconds.

DOES CRUSH DRESSING REDUCE DRESSING TOOL COSTS?

The Sheffield Corporation introduced and pioneered crush dressing in this country and found from several years' experience that wheel dressing costs by this method on many jobs are considerably less than for diamond dressing. Many dressings are possible with the crusher roll—and a large quantity of parts can be produced from one wheel dressing.

CAN CRUSH DRESSING BE USED ON A SURFACE GRINDER?

Fixtures used in mounting crusher rolls on standard surface grinders for crushing wheels to produce flat profiled work, have been developed and pioneered by the Sheffield Corporation. Sheffield engineered surface grinders incorporating crush dressing equipment as an integral part are available.

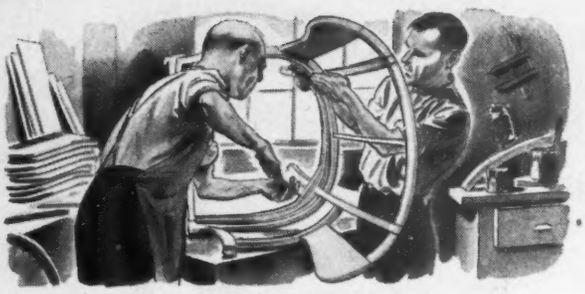
WHERE CAN CRUSHER ROLLS BE OBTAINED?

Stocks of crusher rolls for producing threads in standard pitches are maintained in stock for immediate delivery. Rolls for coarser pitch threads and for all other types of forms can be obtained from Sheffield.

WHERE CAN FULL INFORMATION BE OBTAINED?

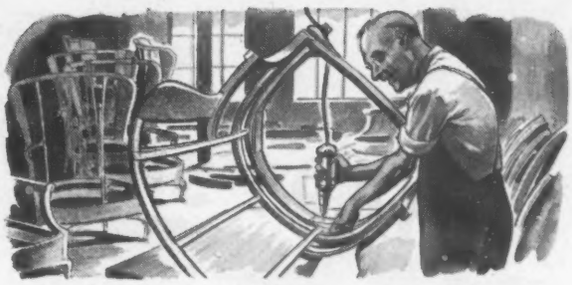
Details on crusher rolls for immediate delivery, surface grinder crusher roll mountings, the Precision Thread and Form Grinder for producing circular formed and threaded parts and the Micro-Form Grinder for producing crusher rolls and other profiles will gladly be sent by the Sheffield Corporation, Dayton 1, Ohio, U. S. A.

Advertisement by the Sheffield Corporation



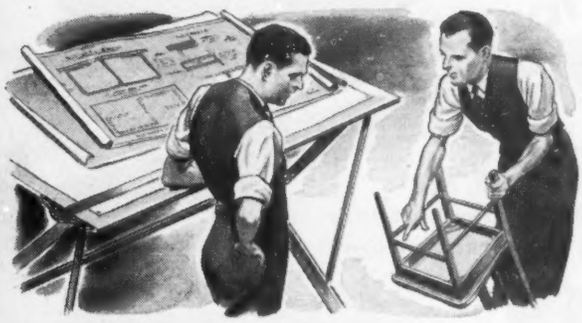
BACKLOG BREAKERS!

Finding it impossible to keep pace with orders as long as he used slotted screws, one leading furniture maker broke up his assembly jams once and for all by switching to faster-driving Phillips Recessed Head Screws.



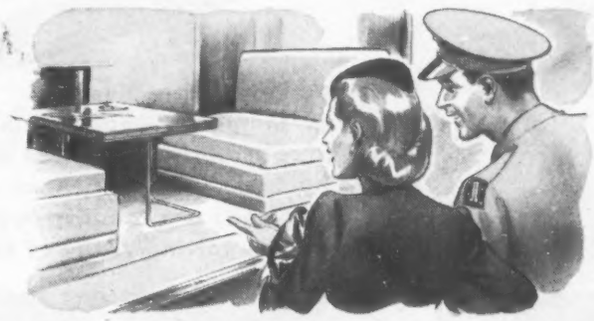
MONEY MAKERS!

This switch cut assembly time almost in half. It cut 10% off pre-assembly by making pilot holes unnecessary. On top of this it saved 33-1/3% in labor costs because Phillips Screws drive so much faster!



PRECEDENT SHAKERS!

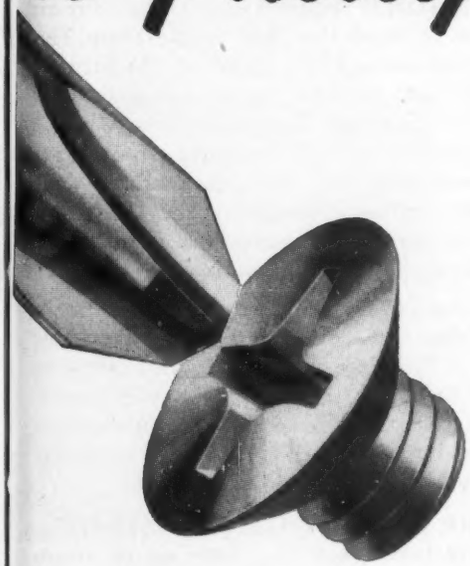
Pace-setters in production and cost-reduction activities, Phillips Screws are helping designers shake things up, too. Much more strength and rigidity can be built into products than was ever possible with slotted screws.



ORDER TAKERS!

And when it comes to buy appeal, other screws just aren't in it with Phillips Screws. Salesmen say they banish burrs that endanger both clothes and sales . . . and make *any* product look stronger, smarter, trimmer!

It's Phillips ... the engineered recess!



In the Phillips Recess, mechanical principles are so correctly applied that every angle, plane, and dimension contributes fully to screw-driving efficiency.

. . . It's the exact pitch of the angles that eliminates driver skids.

. . . It's the engineered design of the 16 planes that makes it easy to apply full turning power – without reaming.

. . . It's the "just-right" depth of recess that enables Phillips Screw Heads to take heaviest driving pressures.

With such precise engineering, is it any wonder that Phillips Screws speed driving as much as 50% – cut costs correspondingly?

To give workers a chance to do their best, give them faster, easier-driving Phillips Recessed Head Screws. Plan Phillips Screws into your product now.

PHILLIPS *Recessed Head* SCREWS

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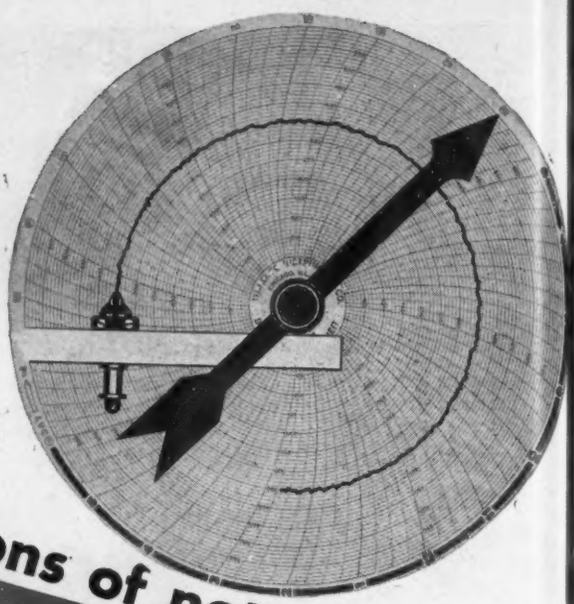
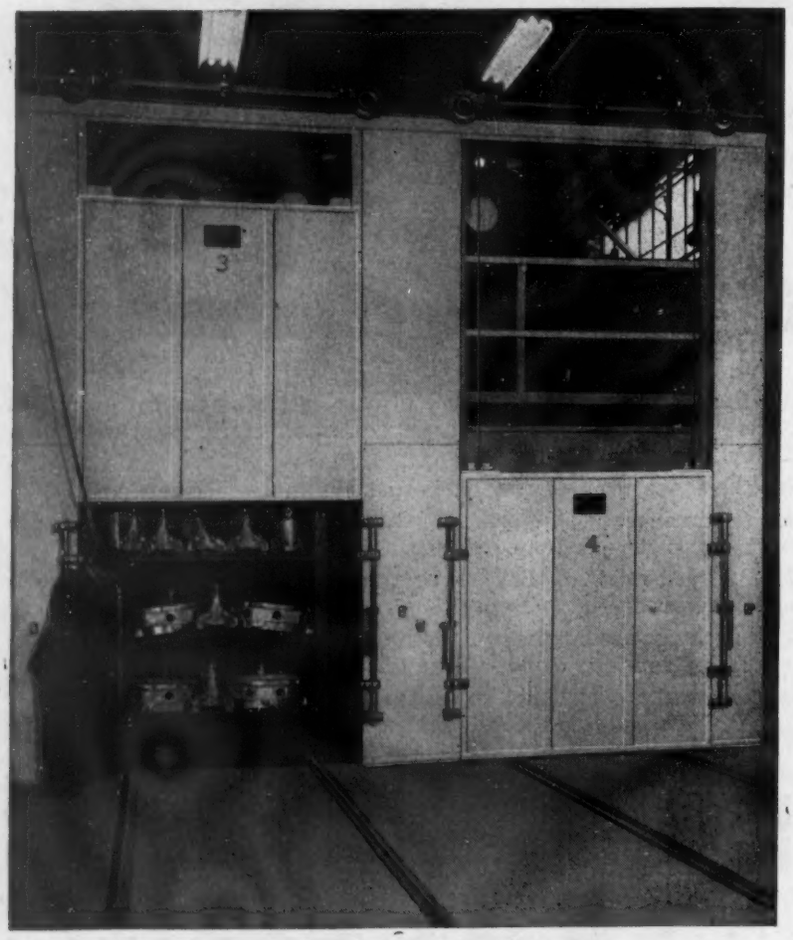
CHART SHOWS temperature variations of not over 5° F.



For aging, annealing, bluing, drawing, tempering, normalizing—Maehler recirculating air heat furnaces are providing heat uniformity that is VIRTUALLY PERFECT. These units are the last word in efficient, low cost operation and are solving many of today's heat treating problems.



An example of how Maehler furnaces are being used for heat treating of magnesium is shown in the photo at the left. These Maehler recirculating air heat furnaces are two of the 46 Maehler units at the Howard Foundries in Chicago. The furnace to the right in the picture is used for aging magnesium castings at 350° F. Full capacity in this furnace is 4000 lbs. From a cold start it requires about one hour for ovens to reach the 350° temperature. The castings are aged for 16 hours. The furnace at the left is used for normalizing magnesium castings. This operation requires 6 hours at 450° F. Furnaces operate independently and are gas fired. Recent reports indicate that during both of these operations temperature chart variations of not over 5° F. are maintained.

Bring your heat treating problems to Maehler—you can do the job better, faster and at lower cost with Maehler furnaces—oil fired, gas fired or electrically heated units available for handling temperatures up to 1300° F. Call a Maehler engineer today or write for latest bulletins.

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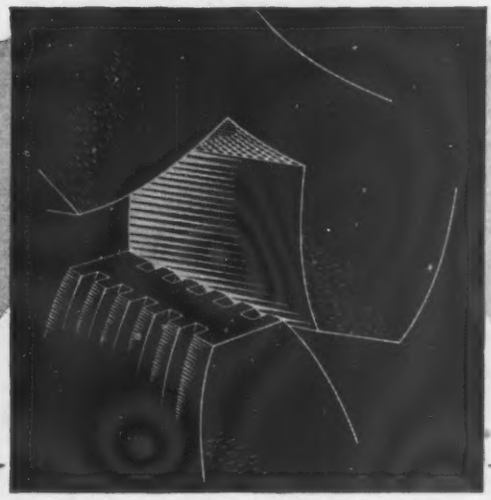
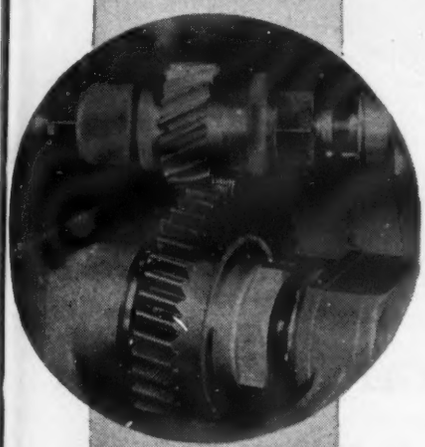
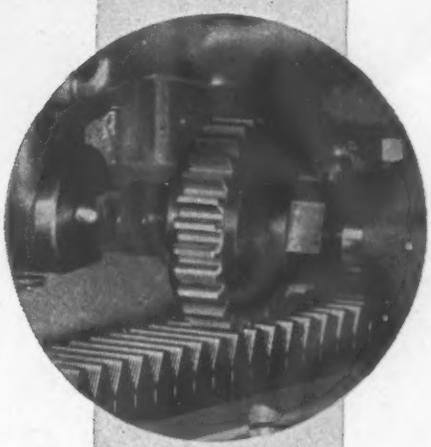


There Are TWO WAYS To Obtain PRECISION GEARS at LOW COST





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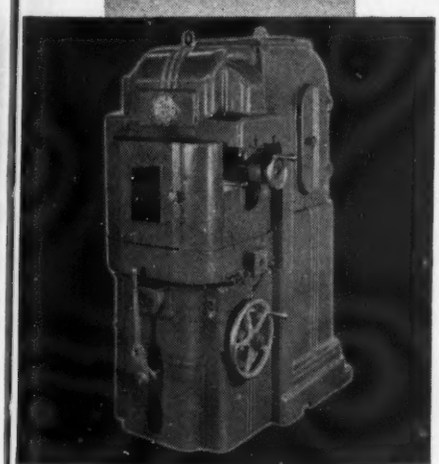

The whole story is told in Manual GF-43 available from

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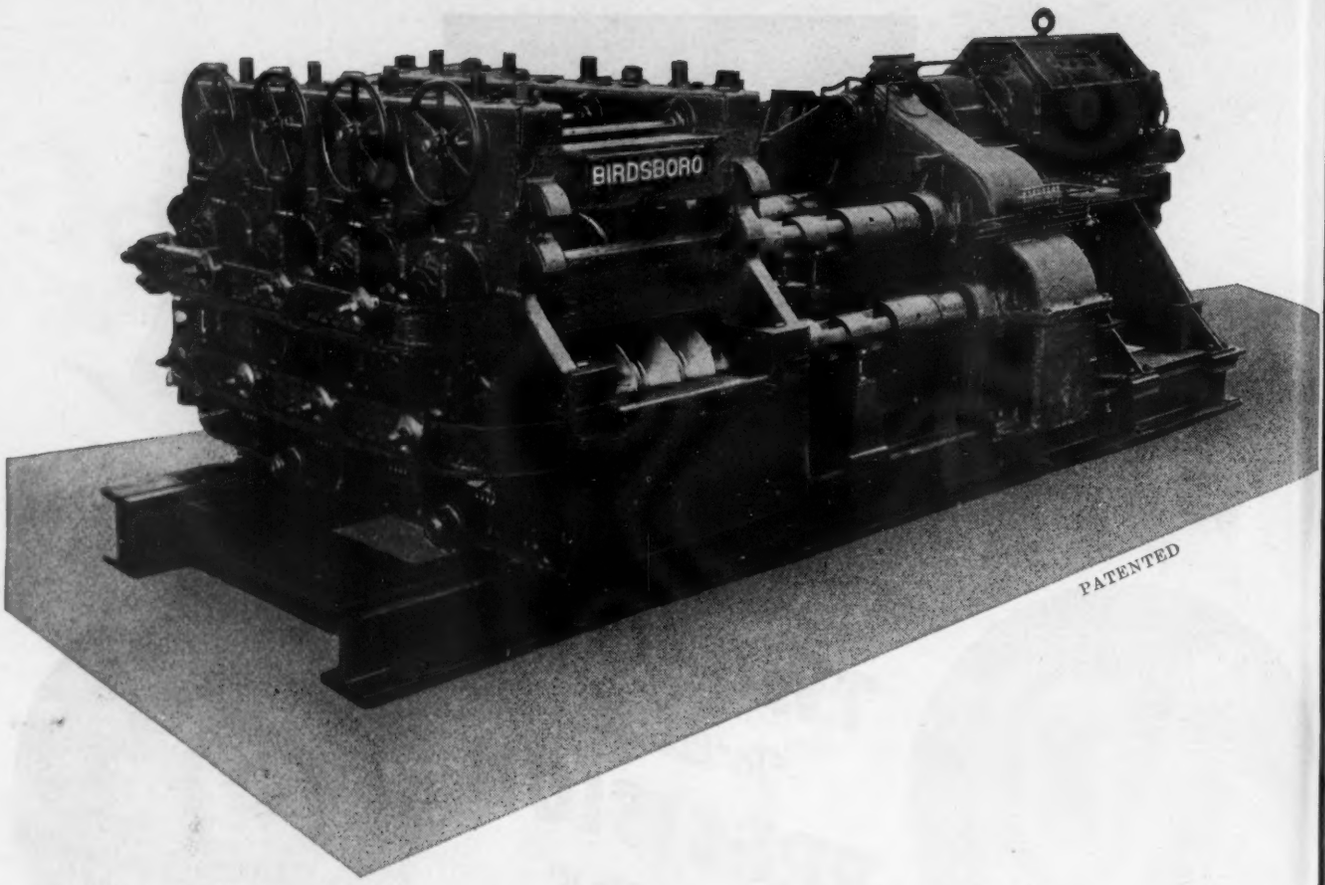

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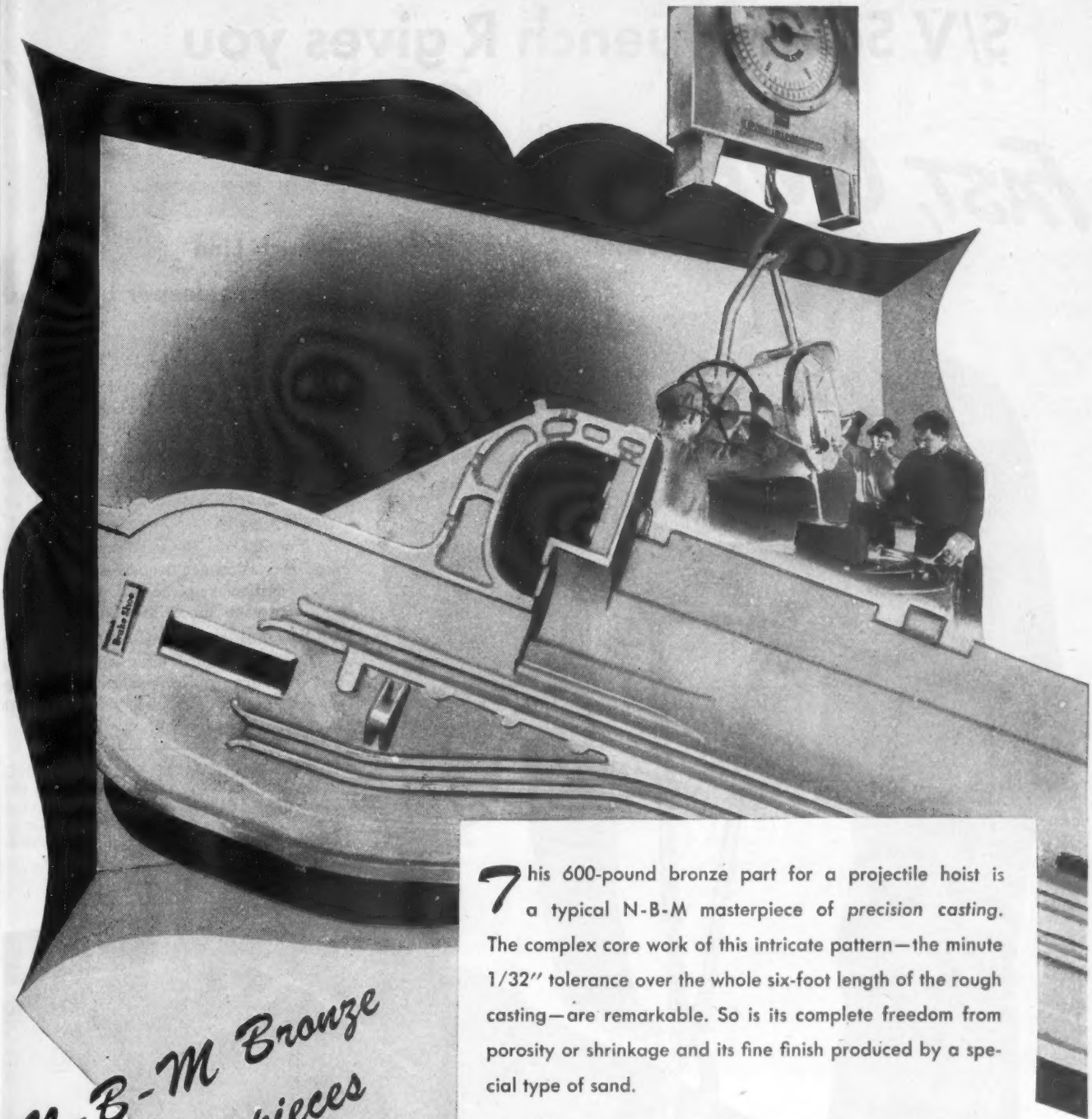

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This 600-pound bronze part for a projectile hoist is a typical N-B-M masterpiece of *precision casting*. The complex core work of this intricate pattern—the minute 1/32" tolerance over the whole six-foot length of the rough casting—are remarkable. So is its complete freedom from porosity or shrinkage and its fine finish produced by a special type of sand.

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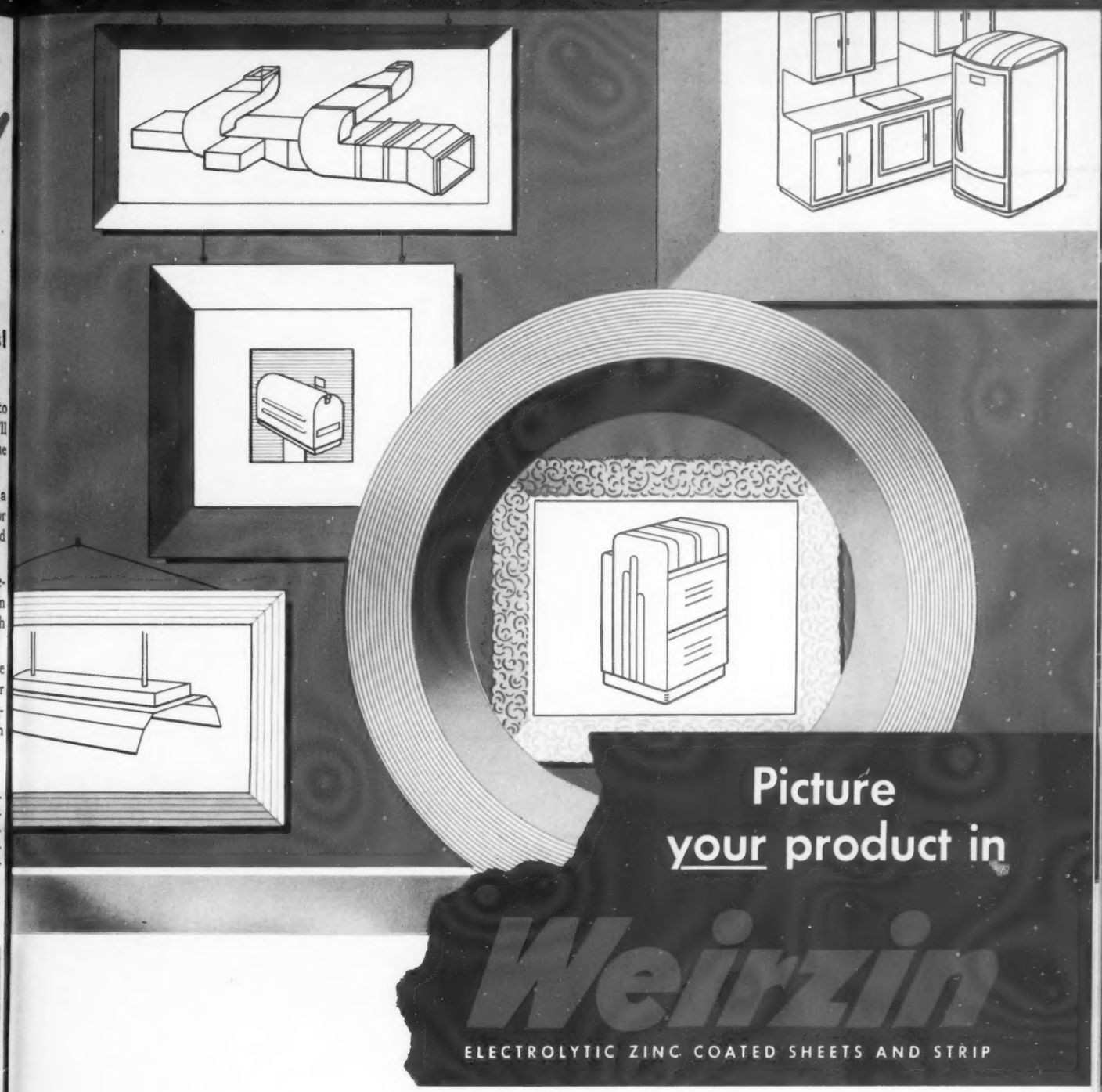

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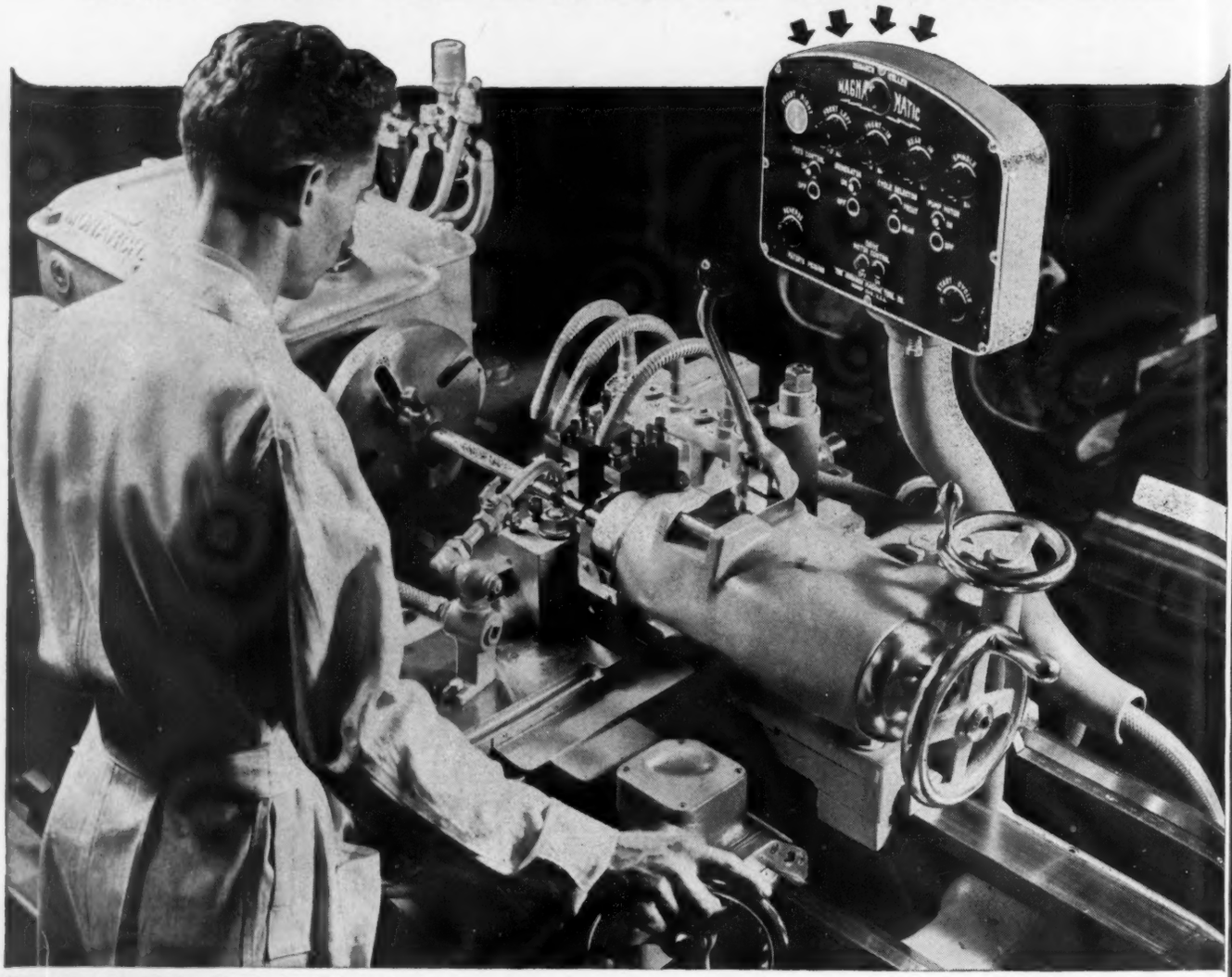

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Controls on the Monarch Magnamatic are concentrated within arm's length for fast setup and easy operation of this modern double carriage, all-electrically controlled turning machine.

Handwheels with micrometer adjustments permit quick setups for economical turning even of short runs. Start-cycle button on panel controls the operating cycle. Electric controls permit automatic selection of six different feed rates for maximum metal removal or for different finishes on various portions of the work.

The Monarch Magnamatic has 10 years of successful performance on peace and war work. Marked advancement in electrical controls has permitted us to improve even its previous satisfactory operation.

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 116, NO. 17 April 23, 1945

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Machining, Finishing and Testing Die Castings
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Our engineers will gladly consult with you regarding your special powering problems. Write Today.

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STEEL
April 23, 1945

From Left to Right

Uppermost in the minds of many industrialists are questions regarding the effect of Mr. Truman's elevation to the Presidency upon government-industry relations. Will private enterprise be given fairer treatment under the Truman administration?

On the basis of most of the conjecture thus far advanced by informed observers, the answer seems to be in the affirmative. The new President classifies himself as a "common-sense liberal" who deplores "red radicalism." Most commentators concur in this description. His voting record in the Senate stamps him as being considerably more conservative than his predecessor, although he has supported many of the better New Deal projects.

President Truman's decisions during his first 10 days in office also have been reassuring. In lunching with Senate friends on the first full day of his service as President, he indicated a desire to re-establish a better degree of teamwork between the Executive and Legislative branches—a gesture that is certain to be reciprocated. His request to Stalin and the latter's prompt decision to send Molotov to the San Francisco conference had the earmarks of practical diplomacy. His prompt statement that no changes would be made in the military direction of the war heartened the Allies and gave no comfort to the enemy. His first major appointment—that of John W. Snyder, capable banker with extensive RFC experience, to the post of federal loan administrator—stands out in sharp and favorable contrast to his predecessor's apparent willingness to entrust the important loan responsibilities to Henry Wallace.

From these and other indications it would seem that one is fully justified in expecting President Truman to chart a course near "center" or a little "right of center," as compared with the late President's "left of center" course.

While hope of a moderate shift to the right must be heartening to industrial leaders and to a substantial majority of the public, it will be a mistake to expect too much from the new President in this respect. No matter how much he may wish to veer from left to right, he is bound by the political complexion of his party to consider the strength of its left wing contingent.

He will need help to extricate the Presidency from too much pressure imposed by the powerful radical minority. That help should be forthcoming from every citizen, regardless of party affiliation, who appreciates the great importance of reversing the trend of dangerous radical influence in our federal government.

HEED THIS WARNING! A corporation heavily engaged in war work, either as a prime contractor or as a subcontractor, will do well to study carefully its position as to working capital.

For instance, there is bound to be a time lag between the date when a war contract is terminated and the date when the contractor's claim against the government is paid. Assume, for example, that a corporation's contract is terminated or that war work is cut back 30, 60 or even 100 per cent and that the time lag before the government pays its claim is two, four, six or more months. Under such circumstances, would the corporation have sufficient working capital to carry on? The problem can be extremely serious particularly if the corporation has heavy renegotiation or income tax liabilities.

Fortunately, there are steps that can be taken to avoid financial embarrassment under contract termination. One is for the contractor to become familiar with contract termination procedure and to follow it carefully so as to effect payment of claims promptly. Another is to take advantage of T-loans and other financial assistance offered contractors.

Rear Admiral H. L. Merring has prepared an au-

(OVER)

thoritative statement on this subject, exclusively for this publication. It deserves attentive reading by all contractors. —p. 71

• • •

LEND-LEASE TO USSR: Shipments to the Soviet Union under lend-lease from October, 1941, through February, 1945, exceeded 16,250,000 tons and represent a dollar value of $8,225,000,000. Transfers to Russia thus far have amounted to 31.7 per cent of the United States government's transfers to all of its allies since the beginning of lend-lease.

Among the items sent to the USSR were 13,000 planes, 12,850 combat vehicles, 1900 ordnance service vehicles, 50,000 jeeps, 308,000 motor trucks, 135,000 submachine guns, 13,000 small arms, 8200 anti-aircraft guns, 306,000 tons of explosives, signal equipment valued at $170,000,000, 1405 locomotives, 10,396 railway cars, submarine chasers, torpedo boats, mine sweepers, tug boats, engines, compressors, machine tools, steel, ferroalloys, nonferrous metals and food.

The foregoing does not include thousands of aircraft flight-delivered nor does it include war services valued at $515,000,000. The volume of aid to Russia is impressive and, judging from events on the Eastern front, has been highly effective, particularly in helping Stalin solve his tremendous problem of transportation. —p. 67

• • •

LIGHTER-WEIGHT CARS: Low-alloy, high strength steels were gaining promising acceptance before the war began to interfere with normal progress. Of the 152,108 new freight cars installed by Class I railroads from 1935 to 1939, inclusive, 35,027 or 23 per cent were built wholly or in part of one of the leading low-alloy, high-strength steels. Of the 1458 passenger cars delivered to railroads from 1934 to 1939, inclusive, 84 or 5.8 per cent were of conventional design, using carbon steel; 159 or 10.9 per cent were of aluminum; 290 or 19.9 per cent were of stainless steel and 925 or 63.4 per cent were of low-alloy, high-strength steels.

In view of this significant prewar trend and with wartime progress in fabrication methods in mind, it seems almost certain that the postwar period will witness a decided shift to the use of low-alloy high tensile steels and other lighter materials for railroad rolling stock. The peacetime market for these steels in some other fields also looks promising. —p. 102

WARTIME MISCELLANY: Not to be overlooked in the reconversion picture is the potential demand for American equipment, materials and supplies for rehabilitation abroad. In addition to inquiries for 30,000 freight cars for France, noted previously, builders now understand (p. 161) that inquiries for 10,000 freight cars for Belgium and 6000 for India will be issued soon. . . . H. F. Bain, consulting engineer for the Bureau of Mines, sees a favorable outlook for the Far West's war-expanded steel industry. He says adequate raw materials are available (p. 61), existing markets can support production in plants of economic size and under capable management competitive conversion costs should be possible. . . . Employers desiring to pool experience in the reinstatement of servicemen in industrial jobs will be interested in a co-operative plan in operation in Cleveland. Eleven industrial corporations collaborate with Fenn College and the Veterans Administration (p. 64) in developing programs for handling returning veterans and training personnel to supervise the programs in each plant. . . . Chester Bowles, OPA administrator, has prepared a clear statement of basic policies governing price control. His explanation (p. 68) of "industry earnings standard," "product standard" and the "cost absorption" principle should help readers to interpret OPA rulings more intelligently. . . . Declared surplus, 134 used machine tools costing $1,123,990 (p. 72) are for sale at Watervliet Arsenal. . . . Weirton Steel Co. has installed a palm oil recovery system in its tin plate department (p. 90) which has cut purchases of new oil 25 per cent and improved quality of tin plate. . . . Cutbacks after V-E Day will increase more rapidly than originally forecast. Production of B-24 Liberator bombers at the Ford Willow Run plant will be terminated by Aug. 1 (p. 62) and production of the B-17 Flying Fortresses at Douglas Aircraft and Lockheed Aircraft will be reduced 50 per cent. Output of B-24 bombers by Consolidated Vultee at San Diego will be halted May 25. In some instances labor and facilities will be shifted to other contracts, but if cutbacks continue at the indicated rates, labor shortages will be relieved and surpluses may appear. . . . Roster of the plants affected by the cutback in the ammunition program (p. 63) shows how widely the shell orders were distributed.

E. L. Shaner

EDITOR-IN-CHIEF

Why These Mean The Same

1 · Ryerson
2 · Steel from Stock

And How They Benefit Your Company Today

Though Ryerson steel-from-stock service to your company today can't always be as complete and fast as we'd like it, nevertheless, certain features of our service are probably more helpful than ever before.

If, for example, some particular item your company needs is not available—though our stocks in eleven plants are more diversified than any in the country—then we do our level best to recommend an item that will serve. And the recommendation is practical—made by men with extensive theoretical as well as practical technical experience with steel.

In most cases we can still deliver the steel you want, when you want it and where you want it.

Thus your purchasing executives can concentrate their steel-buying with Ryerson and know that Ryerson dependability is the same as always. That all your Ryerson contacts will be sincerely interested in helping with your steel problems. That all we have learned from more than 100 years in the steel business is at your service. If your company hasn't our latest Stock List and Data Book, will you please write our nearest plant.

RYERSON CERTIFIED STEELS

JOSEPH T. RYERSON & SON, INC., Steel-Service Plants: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.

RYERSON STEEL

Three operators pierce, punch and trim at each press stroke.

Container Rim Output Increased 300%

Novel die set-up and Inland Sheets increase war part production

Output of cartridge storage container rims, drawn 4 in. deep on an 8-in. diameter, has been stepped up from 400 to 1200 per day. This increase results partly from die design and die use, and partly from the extremely low breakage of Inland Hot Rolled Pickled Sheets.

In the first operation 0.125″ stock is blanked and drawn full depth with ½″ shoulder, in a double acting press. These deep drawn parts are moved to another press in which are mounted two dies, one for piercing out the bottom and the other for sizing the bottom, which is used later to close the container. The two operations are performed at each press stroke.

The rim is then taken to a third press in which are three dies, which pierce locating holes, punch out the start of keyways, and trim on the 8-in. diameter. A rim is completed in three press strokes.

Final operations consist of spot welding three lugs to the inner surface of the rim, finish piercing the keyways, and swedging the lugs to the rim for a close fit.

The increased speed of manufacture of these cartridge storage container rims is an example of how Inland quality steel is helping America win the battle of production.

Inland sheets are blanked and drawn 4-in. deep in one operation.

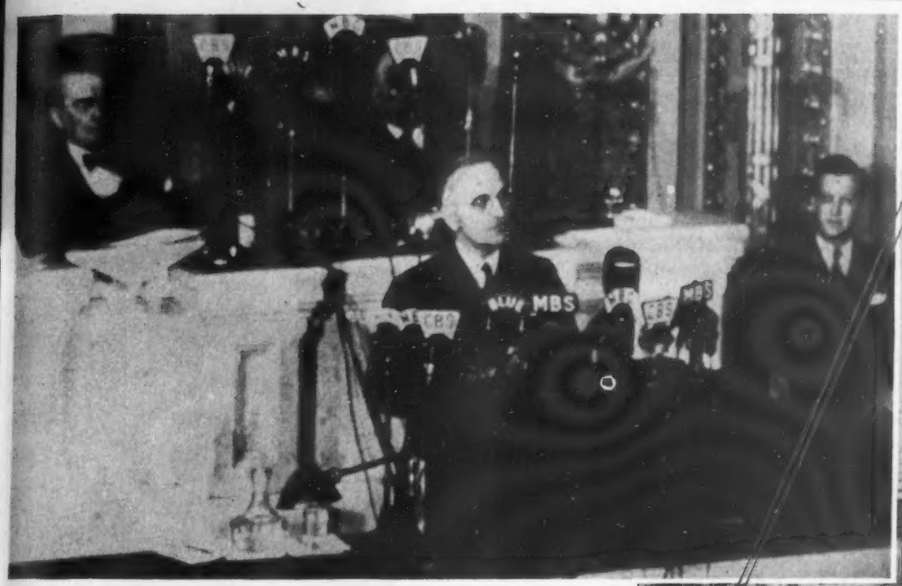
Each stroke of this press pierces out the bottom of a rim and sizes the bottom obtained during the previous press stroke.

INLAND STEEL CO.

38 S. Dearborn St., Chicago 3, Ill.

Sales Offices: Cincinnati • Detroit • Indianapolis • Kansas City • Milwaukee • New York • St. Louis • St. Paul

Middle-of-Road Course Seen for Truman's Administration



More conservative policies expected to develop under new President. Many left-wingers may be replaced. Better balance in government to be restored. Businessmen's stock to rise in Washington

President Truman's first appearance before Congress as President, left above, was greeted with waves of applause from all factions and indicated he starts his administration with unified support of the legislators. Also shown above is the flag at half-mast above the Senate office building with the Capitol in the background. NEA photos

WASHINGTON

GRADUAL shift toward more conservative government policies, with social reforms already achieved being retained, will develop under the administration of President Truman.

The new Chief Executive will work much more closely with Congress than did his predecessor, and, in turn, will receive much more co-operation.

He will strive for better balance in the administration. Personal government will tend to disappear and more authority will be delegated to department heads. Some of the left wing officials and advisors in high places will drop from sight.

His administration will be liberal, but will not be characterized by the extremes which at times have featured the past 12 years.

Compromise again will become honorable and possible.

Organized labor will continue a major factor in national politics. Its spokesmen will receive all that is due them, but it is doubted that the new President will yield to any claims for overpayment.

In general, Mr. Truman's course will be a "little right of center." As a result, businessmen may expect fairer treatment in Washington circles.

This was the consensus of capital analysts as the Missourian took up the reins of his office with a minimum of confusion and urged the nation to carry on in its greatest task—winning the war.

Mr. Truman's ascension to the top office of the land was warmly received by a large majority of the people. His first actions—an address to Congress, a press conference, a declaration of intention to retain for the present practically all the cabinet and advisors of his predecessor and in general to carry on the national program, a promise that the military leaders would be wholeheartedly supported in the prosecution of the war, "unchanged and unhampered,"—won the approbation of both supporters and opponents of the Roosevelt administration. The decision not to disturb existing agencies and policies at this time is not interpreted as precluding a gradual move toward the right and a more conservative government under which businessmen should fare better than they have in recent years.

Mr. Truman has described himself as "a common-sense liberal" who deplores "red radicalism" as much as he does

adamant reaction. His environment in the farmlands of Missouri, where his father was a former confederate soldier and where a southern tinge influences the atmosphere, is credited with imbuing him with basic conservatism.

One advantage which the new President brings to the White House is the sincere approbation of the legislative branch, where he spent two terms in the upper house and where he is highly regarded. This approbation was manifest in Mr. Truman's first appearance before Congress where he was greeted by wave after wave of applause from the floor and the gallery. Evident was a rallying to his side and a readiness to forget party and factional differences for the sake of meeting the emergency.

While the new President asked the members of the Roosevelt cabinet to remain at their post for the present, belief is general that this advisory group gradually will be reformed. Speculation as to probable changes affected practically every department except War and Navy.

"Sidewalk statesmen" focussed attention particularly on the Department of State, which must play the heaviest role in making the peace after the war is won and whose head now is next in line for the Presidency. The department was recently reorganized with Edward R. Stettinius, former chairman of the United States Steel Corp., as secretary, and is generally considered to be effectively organized.

Byrnes May Direct Foreign Policy

However, James F. Byrnes, who recently resigned as director of the Office of War Mobilization and Reconversion, is persistently rumored to be slated to head up foreign policy in the new administration. As this was written, the issue had not been resolved, but some observers were predicting Mr. Byrnes would replace Mr. Stettinius as secretary of state. Others believed Mr. Byrnes might head a small group of advisors on foreign policy and that the State Department would be left intact.

Whatever his title may become, practically all observers expect Mr. Byrnes, who in addition to serving as OWMR director is also a former senator and former Supreme Court justice, will become an influential member of the Truman administration.

Mr. Truman considers Mr. Byrnes one of the best all-around men in Washington. The two are believed to have almost identical theories of government and should make an effective team.

Among the first of the Roosevelt cabinet to be given the ax by the bystanders was Attorney General Francis Biddle. Many believed Mr. Biddle will be replaced, possibly by Hugh Fulton, who served as counsel for the Senate Defense Investigating Committee when Mr. Truman was chairman of that group.

Miss Frances Perkins, secretary of labor, is another whose replacement is freely forecast. Miss Perkins, a close personal friend of Mr. Roosevelt, reportedly has been anxious to resign and her loss would not be felt too keenly in most quarters. For years she has not been overly active in the Labor Department. Among those mentioned for the post is Sen. Harley M. Kilgore (Dem., W. Va.).

Henry Morgenthau Jr., secretary of the treasury, another close personal friend of Mr. Roosevelt, is another replacement of whom also is considered likely. Mr. Morgenthau called on the new President last week and tendered his resignation but was asked to remain at his post. Although he eventually may be removed, many believe such action will not be taken immediately in view of the huge task of war financing in which the incumbent secretary is currently engaged.

Secretary of Interior Harold Ickes, one of the more voluble spokesmen for the left wing group in the administration, and one who has gotten in the hair of many people within and without the administration, may be another casualty of the change.

As to Henry Wallace, recently named secretary of commerce after a sharp congressional battle in which the Department of Commerce and the government lending agencies were divorced, no one believed Mr. Truman would urge him to depart. Mr. Wallace for the moment is carrying the flag for the left wing group and for organized labor and his ouster probably would precipitate a split within the party. Possibly if Mr. Wallace were dismissed a third party, with Wallace as the standard bearer, might appear on the scene.

However, Mr. Truman's friends do not believe he will assign to Mr. Wallace the gigantic job of supervising reconstruction and creating 60 million jobs, as Mr. Wallace would like. Neither is he likely to subscribe to the "milk for the Hottentots" type of theories of Mr. Wallace. Whether Mr. Wallace will desire to remain in the cabinet under the new circumstances is problematical.

Positions Are Undefined

The positions of Claude Wickard as secretary of agriculture and Postmaster General Frank Walker remained undefined. Mr. Walker is reported ready to step down. Traditionally the postmastership would go to Robert Hannegan, head of the Democratic National Committee and a close friend of Mr. Truman.

Henry L. Stimson and James V. Forrestal of the War and Navy Departments are not expected to be affected by the change. Both are reputed nonpartisan and highly efficient personalities. However, one rumor would have K. T. Keller, Chrysler Corp. president, eventually replacing Mr. Stimson in the War Department.

Most of the personal advisors with which Mr. Roosevelt had surrounded himself are expected to look for other people to advise. These include Harry Hopkins, Judge Samuel Rosenman and David K. Niles.

JAMES F. BYRNES

Until recently "Assistant President" and director of the Office of War Mobilization and Reconversion, Mr. Byrnes is expected to assume an influential role in the administration of President Truman. Above he is shown arriving in Washington to offer his assistance soon after hearing of the death of Mr. Roosevelt. NEA photo

Considerable curiosity was expressed as to the future of the heads of many of the independent agencies created by the New Deal. Fred M. Vinson, director of the Office of War Mobilization and Reconversion, generally is expected to be retained. J. A. Krug, chairman of the War Production Board, likewise is considered a carry-over.

The position of Chester Bowles, head of the Office of Price Administration, has been made uncertain by recent criticism over the food situation. His job is one of the most ticklish in the administration and on the whole is considered ably administered.

What will happen to William H.

Davis, director of economic stabilization, and Dr. George W. Taylor, chairman of the War Labor Board, and the heads of many other agencies remains an open question.

Whatever changes in personnel are to be made will be announced gradually to hold disruption of functioning of the agencies to a minimum.

One of Mr. Truman's first major appointments was that of John W. Snyder, St. Louis banker, as head of the federal lending agencies. Mr. Snyder had been recommended for the loan post before Mr. Roosevelt's death by Jesse Jones, former secretary of commerce and loan head before he was ousted to make room for Henry Wallace. Mr. Snyder was manager of the St. Louis branch of the Reconstruction Finance Corp. from 1937 to 1940 when he became RFC executive vice president, director of the Defense Plant Corp., and assistant to Jones. He has been vice president of the First National Bank of St. Louis since Jan. 1, 1943.

Mr. Truman's early statements on policy presaged a general continuation of the course established by Mr. Roosevelt. He has reiterated that the war must be vigorously prosecuted until the unconditional surrender of both Germany and Japan.

He has endorsed the Bretton Woods proposals and declared the country needs an international monetary setup. He also favors a reciprocal trade agreement program; while in the Senate, he supported the administration's program.

On the domestic side, he has announced he will go ahead with public power projects wherever possible and necessary. He has endorsed the Missouri Valley authority, but declined to comment on the proposed St. Lawrence seaway proposal.

Present, Past and Pending

■ ALABAMA COAL STRIKE CUTS PIG IRON, STEEL OUTPUT

BIRMINGHAM, ALA.—Pig iron, steel ingot and finished steel output is sharply curtailed here with "captive" coal miners still largely idle. In rail connected commercial mines production is about 75 per cent of capacity.

■ COMMUNICATIONS WIRE OUTPUT SETS NEW RECORD

WASHINGTON—Output of communications wire for the armed services established a new record during March of 267,000 miles, gain of 22 per cent over February.

■ TOOL MANUFACTURERS FORM EXPORT ASSOCIATION

NEW YORK—An association to serve export business has been formed by four manufacturers under the name of American Machine Tool Export Associates. Initial sponsors are Landis Tool Co., Waynesboro, Pa.; Lodge & Shipley Machine Tool Co., Cincinnati; Kearney & Trecker Corp., Milwaukee, and Warner & Swasey Co., Cleveland.

■ FAIRLESS PREDICTS GOOD POSTWAR STEEL DEMAND

PITTSBURGH—Benjamin F. Fairless, president, U. S. Steel Corp., predicts foreign requirements combined with domestic demand will provide a market for a higher percentage of steel production than in normal years.

■ HEAVY INDUSTRY IMPORTANT IN POSTWAR EMPLOYMENT

CHICAGO—Heavy industry should make a substantial contribution to postwar employment, because wartime technological advances will stimulate purchase of improved transportation equipment and machine tools, R. C. Ingersoll, president, Ingersoll Steel & Disc Division, Borg-Warner Corp., stated here last week.

■ STRIKING WORKERS AT U. S. STEEL'S GARY PLANT RETURN

CHICAGO—The 130 striking workers on the hot pickling lines at Gary sheet and tin mills of Carnegie-Illinois Steel Corp. returned to their jobs April 13 at the order of WLB to which the month-old dispute had been certified.

■ CLAYTON URGES RENEWAL OF TRADE AGREEMENTS ACT

WASHINGTON—Assistant Secretary of State, W. L. Clayton, last week urged the renewal of the Trade Agreements Act with authority to further reduce existing tariffs as a means of assuring American postwar prosperity.

■ SEEK FULL EMPLOYMENT FOR SMALL BUSINESS

WASHINGTON—Secretary of Commerce Wallace met last week with the Small Business Advisory Committee to discuss ways and means to get the fullest possible employment for this industrial group in the postwar period.

■ ENAMELED WARE MANUFACTURERS GET LESS STEEL

WASHINGTON—About 35 per cent less steel was available for allotment by the WPB Consumers Durable Goods Division, to manufacturers of enameled ware in the second quarter, compared with that for the initial three months this year.

■ FOREMEN VOTE IN FAVOR OF UNION REPRESENTATION

DETROIT—Election among foremen at the Packard plants on the question of whether they desire to be affiliated with the Foremen's Association of America, went in favor of the union.

To Hold Public Hearings on Postwar Tool Disposal

Public hearings on the problems involved in the disposal of the government's huge stock of machine tools at the end of the war will be held in Washington April 25, 26 and 27, and will be participated in by federal officials and representatives of industrial groups.

Over $4 billion worth of machine tools have been built in this country for war purposes, about 70 per cent of which are owned by the government.

The machine tool builders will have as spokesmen at the hearings Tell Berna, general manager, National Machine Tool Builders Association, Cleveland; H. H. Pease, president, New Britain Machine Co., New Britain, Conn.; William P. Kirk, vice president, Pratt & Whitney, West Hartford, Conn. The National Screw Machine Products Association, Cleveland, will be represented by Orrin B. Werntz, executive secretary; Fred C. Phillips, president, F. C. Phillips Co., Stoughton, Mass., and R. D. Perry, of the Perry-Fay Co., Elyria, O.

Favorable Outlook Seen for West's Steel Industry

Favorable opportunities exist for the West's war-expanded steel industry in the postwar period, according to a report prepared for the United States Bureau of Mines by H. F. Bain, consulting engineer of the bureau.

Pointing out that operation of the new steel plants will depend first upon adequate financial backing and recapitalization to write off the costs chargeable to the war, Mr. Bain lists these three conclusions: (1) Adequate raw materials are available and the defects in quality can be overcome. Reasonably competitive assembly costs can be obtained; (2) existing markets can support production in plants of economic size, subject to the usual vicissitudes of the steel business but permitting expectation of growth; (3) under capable management, operating with competitive conversion costs should be possible.

Bomber, Engine Programs Curtailed

Willow Run plant to cease production of Liberators by August. Flying Fortress schedules reduced 50 per cent in two plants

WAR production cutbacks are preceding the fall of Germany and after V-E Day will increase at a more rapid rate than originally forecast. Within three months after the defeat of the Nazis, such cutbacks will reach 24 per cent, double the 12 per cent estimated by War Production Board officials earlier this month. Six months after European victory, cutbacks will have reached at least 36 per cent and will be 50 per cent within a year, according to revised schedules. The WPB Steel Division last week was preparing new V-E Day recommendations for WPB Chairman Krug.

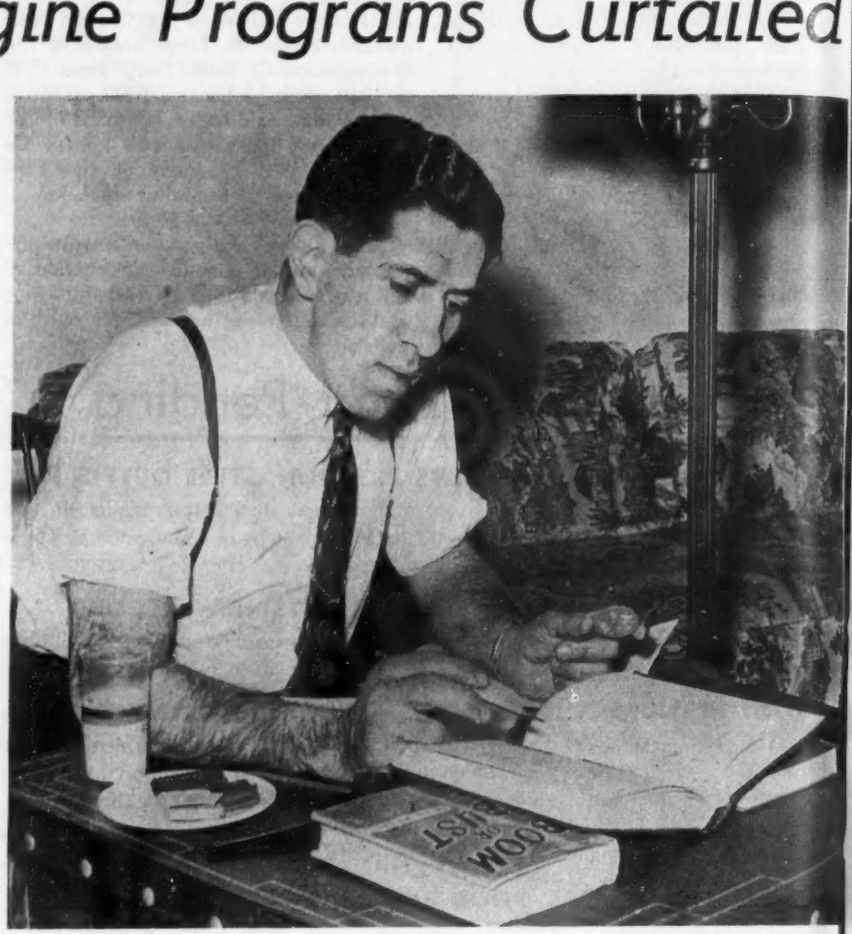
Following the decision not to complete 12 projected tank factories and a $200 million cutback in artillery ammunition plants and facilities (STEEL, April 16, p. 78), came announcements that production of B-17 Flying Fortresses at the Douglas Aircraft Co. and Lockheed Aircraft Co. will be reduced 50 per cent. Production of B-24 Liberator bombers will be terminated at the Ford Willow Run plant by Aug. 1.

Production of the B-24 by Consolidated Vultee Aircraft Corp. at San Diego, Calif., will be halted May 25 as a result of cancellation of the company's contract. Labor and facilities freed will be utilized in building the B-32 superbombers and the RY-3 transports. Lockheed's contracts for the P-38 fighter plane will be gradually tapered off.

Shell Steel To Continue Tight

The artillery ammunition cutback will eliminate the necessity for a projected 22 per cent increase in shell requirements for third quarter and needs for this period will level out at about the June, 1945, schedule which is somewhat higher than present schedules but less than anticipated, according to WPB. The shell steel supply will continue tight and new programs are in the making which will tend to offset the reduction in volume in some categories.

The reduction in production of Flying Fortresses at the Douglas and Lockheed plants will be gradual over the next several months. Affected will be more than 2000 suppliers of material and equipment for Douglas and at least 1000 for Lockheed. These suppliers include subcontractors making integral parts for the planes. In conformity with regulations governing cutbacks of planes, all contractors and suppliers were notified of the reduced schedules.



To assist in planning for the reconversion of industry to civilian production, Robert M. Nathan, formerly an advisor on programming to Donald M. Nelson when the latter was chairman of the War Production Board, has been appointed a deputy to Fred M. Vinson, director of the Office of War Mobilization and Reconversion. NEA photo

Both Douglas and Lockheed officials believe the cutbacks will not necessitate laying off any great number of workers. Douglas said the necessary reduction in working force could be absorbed by "quits" which have been averaging between 450 and 500. Lockheed expects to take up the personnel slack in much the same way. Acceleration of production of the company's jet plane, the P-80 Shooting Star, also will help absorb any surplus labor.

The cessation of B-24 production at the Willow Run plant will affect 21,731 employes at the bomber plant, 9000 more at other Ford plants and an estimated 70,000 in the plants of suppliers and subcontractors. Initial layoffs will be largely women employes, who constitute 34 per cent of present plant employment.

As result of the cutback in the B-24 bomber program, Buick production of Pratt & Whitney engines for this plane will be halted immediately at the company's Flint, Mich., and Melrose Park, Ill., plants. The cutback will affect about 8000 workers, about equally divided at the two plants. Other aircraft engine programs of Buick are not affected.

In the three years of Willow Run's operations, more than 8000 of the four-engine bombers were produced, peak production being reached in March 1944, when 462 complete units were made. Production schedules for this month call for 248 of the regular N model, and two of a revised N model with a single-tail design. For May schedules call for 166 regulars and two N models; for June, 154 regulars and six N models; and July, 103 regulars.

Reason assigned to the cutback was the sudden collapse of the Luftwaffe and the accumulation of a substantial backlog of B-24 bombers by the Army Air Forces.

The Willow Run plant is one of the largest and most costly government-financed aircraft facilities in the country, running well over $100 million an

occupying a 67-acre tract of land with 22 miles of concrete runways.

While the AAF reports it is making studies in co-operation with the WPB as to possible use of the plant's facilities for some other type of war production, this likely will prove difficult since the basic design of the plant and equipment revolves around production of a single type of heavy bomber in quantity. At one time the Ford management indicated interest in eventual acquisition of Willow Run or part of it for production of farm tractors and agricultural machinery, but no formal application has been made yet.

Closing of Willow Run, reduction of other heavy bomber programs and cancellation of shell and tank projects probably heralds the beginning of other cutbacks on materials designed primarily for the European war. These cutbacks may pile up fast in the ensuing weeks. Displaced male workers may find other war jobs for a while but the time soon may come when they must return to peacetime jobs.

Cutbacks Get Increased Attention

This probability is directing increased attention to WPB policy on cutbacks and to reconversion planning. The WPB Requirements Committee recently asked all claimant agencies to submit a new set of requirements on the assumption that victory in Europe will come before June 30. The committee's action represents one of the most tangible steps the WPB has yet taken to scale down strictly military demand for steel, copper and similar materials.

To aid in planning for reconversion, Robert M. Nathan, formerly a planning advisor to Donald M. Nelson when the latter was chairman of WPB, has been appointed a deputy to Fred M. Vinson, director of the Office of War Mobilization and Reconversion.

Further details of WPB's preparations for reconversion to civilian production were revealed last week by Chairman J. A. Krug. Noting that the most critical factor confronting many industries in reconverting is the need for obtaining machine tools and equipment, Mr. Krug said that no preference ratings would be assigned except for "filling in" and "bottleneck" tools and equipment without which a civilian production line would be unable to operate.

"This policy will assist industries with long lead time tools, such as the automotive industry, to get ready for production.

"It is not possible at this time," Mr. Krug pointed out, "to authorize the procurement by industries desiring to build new plants or set up entirely new production lines of all of the tools and equipment needed for such lines."

Mr. Krug outlined the criteria which will be used by WPB in supplying a AA-3 rating to applicants for "bottleneck" tools and equipment. These criteria are as follows:

1—There is no reasonable prospect that the items can be acquired at the times requested without a rating. This condition will usually exist only in cases of items having a long manufacturing time so that unrated deliveries are difficult to schedule.

2—The time requested for delivery is such that, if V-E Day were to occur immediately and applicable WPB restrictions on production were removed, the purchaser's resumption, initiation or expansion of production would be materially delayed by failure to receive the item on the specified date.

3—The item is needed for production at the minimum economic rate.

4—The items are only a small "bottleneck" portion of the total equipment needed for the civilian production, the remainder being on hand or available without special assistance.

5—The items are actually needed to permit production, either in the purchaser's plant or an industry dependent on him, and are not to replace or supplement existing equipment which is adequate though less efficient.

6—The product which the applicant will manufacture must generally be one that is needed for the civilian economy.

The same criteria will be used in authorizing minor amounts of construction necessary to set up workable lines of production for civilian products.

In announcing the new details, WPB revealed that a $50 million machine tool program and a $35 million construction program had been approved for the reconversion of the automotive industry, with AA-3 rating granted.

In Detroit, Henry P. Nelson, WPB coordinator of automotive reconversion, said the extension of the AA-3 ratings would apply to all industries facing critical reconversion problems.

To accelerate study of automotive machine requirements, R. F. V. Stanton of the WPB tools division will undertake to work directly with the individual companies to keep them in closer touch with the tools division at Washington.

Related to the machine tool problem is the perfection of some means for manufacturers to obtain release of company-owned equipment now busy on war work, but which might be replaced with surplus government-owned tools. The automotive industry estimates two-thirds of its equipment is in this category. With regard to the acquisition of surplus government owned tools, it has been proposed that instead of preparing detailed lists of all these items to circulate among prospective automotive buyers, the latter instead list their critical and immediate requirements and circulate these lists among other companies and to government agencies to permit a speedier determination of whether or not the specific machines are available.

In discussions with automotive production officials, Bertrand Fox of the WPB materials committee reported it was too early as yet to determine the extent of availability of various materials after V-E Day, in view of steadily mounting war contract cutbacks, but that surveys are being made which soon will give a clearer picture. It was indicated that at the moment paint looks to be a most critical item of supply for automotive needs.

Affected by Ammunition-Shell Cutbacks

Forgings for shell, 75-millimeter: Bonney Forge & Tool Works, Emmaus, Pa.; Cole Engineering Co., Blanchester, O.; National Supply Co., Washington, Pa.; Rheem Mfg. Co., Bessemer, Ala.

Shell, 60-millimeter: Flannery Bolt Co., Bridgeville, Pa.; Louis Marx Co., McMechen, W. Va.; Railway Industrial Engineering Co., Greensburg, Pa.; Fletcher Enamel Co., Dunbar, W. Va.; Hays Mfg. Co., Erie, Pa.

Forgings for shell, 60-millimeter: Continental Can Co., McKees Rocks, Pa.; Lehigh Foundry Co., Easton, Pa.; Firestone Steel Products Co., Akron, O.

Fuse, M-48: Bigelow-Sanford Carpet Co., Amsterdam, N. Y.; Technifinish Laboratories, Rochester, N. Y.; E. G. Budd Mfg. Co., Bustelton, Pa., and Philadelphia; Hoover Co., Massillon, O.; Wright Automatic Machine Co., Durham, N. C.; Nineteen Hundred Corp., St. Joseph, Mich.; Bowser Inc., Ft. Wayne, Ind.; Ballard Aircraft, Arthurdale, W. Va.; McEvoy Industries, Houston, Tex.; National Cash Register Co., Dayton, O.; Remington Arms, Denver; Globe Hoist Co., Des Moines, Iowa.

Shell, 105-millimeter: General Railway Signal Co., Rochester, N. Y.; Pullman Standard Car Co., Hammond, Ind.; United Shoe Machinery Co., Lowell, Mass.; U. S. Hoffman Machine Co., Poughkeepsie, N. Y.; General Motors Corp., Olds Division, Kansas City, Mo.; J. A. Jones Construction Co., Sheffield, Ala.; Higgins Industries, New Orleans; Baldwin Piano Co., Cincinnati; Tokheim Engineering Co., Indianapolis, Ind.; Brown & Root Co., Houston, Tex.; Electric Boat Co., New London, Conn.; General Motors, Kansas City, Mo.; Jones & Laughlin Steel Corp., McKeesport, Pa.

Forgings for shell, 105-millimeter: Rheem Mfg. Co., Las Vegas, Nev.; National Supply Co., Washington, Pa.

Shell, 81-millimeter: Peerless of America, Marion, Ind.; Excel Foundry Co., Fall River, Mass.

Stampings for shell, 81-millimeter: Chase Brass & Copper Co., Cleveland.

Shell, 75-millimeter: Palmer Bee Co., Ellettsville, Ind.; Remington-Rand Inc., Marietta, O.; Harris Mfg. Co., Johnson City, Tenn.; Airflow Corp., Wilkes-Barre, Pa.; Coplay Cement Co., Allentown, Pa.; Dravo Corp., Neville Island, Pa.; Van Norman Machine Co., Springfield, Mass.; Ludington-Griswald Inc., Saybrook, Conn.; H & B American Machine Co., Pawtucket, R. I.; Rheem Mfg. Co., Brooklyn, N. Y.; Stockham Pipe Fitting Co., Birmingham, Ala.

Booster: Barr Mfg. Co., Weedsport, N. Y.; Robertshaw Thermostat Co., Youngwood, Pa.; High Standard Mfg. Co., Hamden, Conn.; Brunner-Ritter Co., Bridgeport, Conn.; Moraine Products Co., Dayton, O.; Midwest Mach. Co., Columbus, O.; Domestic Mfg. Co. Inc., Los Angeles; Lamb-Grays Harbor Co., Hoquiam, Wash.; Kaiser Industries, Denver; Stuart Engineering Co., Norwalk, Conn.; Lamson Corp., Syracuse, N. Y.; Electric Autolite Co., Toledo; Kaiser Industries, Scranton, Pa.

Fuse, M-54: Holley Carburetor, Detroit; Central Specialties, Ypsilanti, Mich.; Milwaukee Gas & Specialties Co., Milwaukee; Pitney Bowes Postage Meter Co., Stamford, Conn.; Litho Equipment Co., Chicago; International Harvester Co., St. Paul.

Time train rings for fuse, M-54: Gilbert & Barker, Springfield, Mass.; Holst, Milford, Conn.; Perkins Machine & Gear Co., Springfield, Mass.

Cleveland Seminar Studies Reinstatement

ORIGINAL research into the problems of placing war veterans in industrial jobs and of adjusting the servicemen to the jobs is being undertaken at Cleveland in a unique seminar in which 11 industries and a college are co-operating.

The problems to which the group is giving attention are so new that little suitable previous information on them is available. Consequently members of the group are developing their own manual of procedure, pooling and incorporating their thoughts and experience in dealing with veterans already returned to industry.

The seminar is studying the veteran's problem from the time he applies for employment until he is completely adjusted to the job. These problems, already important, will become more so as the volume of returning servicemen swells.

Industries participating in the program are: Cleveland Electric Illuminating Co., Cleveland Graphite Bronze Co., Ferro Machine & Foundry Co., General Dry Batteries Co., Lake City Malleable Co., Lamson & Sessions Co., National Screw & Mfg. Co., Thompson Aircraft Products Co., Warner & Swasey Co., Weatherhead Co., and White Motor Co.

Co-operating with these industries are Fenn College, which initiated the project, and the Veterans Administration, which acts in an advisory capacity.

Started last October, the 12-month course has two purposes: 1. Developing a program for handling returning veterans in industry; and 2, training the person selected by a company to put into effect and steer the program in that company's plant.

For the first three months of the course, the study group worked three half-days and one evening each week on a program for getting veterans back into civilian employment. The remaining nine months are being devoted to providing the group with professional training and experience in counseling, including laboratory practice in vocational testing and guidance. At present, the group meets two half-days a week.

Classes are held at Fenn College, where a vocational testing and guidance laboratory is available. The course is conducted by the college's department of personnel development, of which Joseph S. Kopas is director.

Indicative of their earnestness in getting right at the problem, the men, several of whom are war veterans, doff their coats, roll up their shirt sleeves, and enter into lively discussions in the classroom. They don't hesitate to disagree with one another, or their instructor, Mr. Kopas. Through this freedom of discussion, guided by Mr. Kopas, all phases of a problem or theory are brought into the open and examined. Thus, figuratively, the wheat is separated from the chaff and a program for intra-plant dealing with veterans assembled. Analysis of practices of personnel work gives the students an opportunity to understand the theories underlying their daily work, and this knowledge of theories tends to improve their skills as personnel men.

It is emphasized in the course that the largest portion of the work of refitting war veterans into civilian life falls upon industry. Next to his home and family, a job is most important to a veteran, and satisfactory employment is a most desired factor in his readjustment to civilian life. The armed services spend months, sometimes several years, to prepare a man for the regimented life of a soldier, sailor or marine. Even if the serviceman does not have physical or mental handicaps when he is discharged from service he most likely will have undergone some emotional changes in the time he has been away from civilian life. For example, the veteran remembers his home, wife and children as the way they were the day he went away. In the meantime, his home's standard of living has had to drop, which has resulted in his wife's developing a resent-

Pictured at a meeting of a Cleveland seminar on industry and the war veteran are, left to right around table: Rita F. Bothwell, Lake City Malleable Co.; H. G. Christenson, Veterans Administration; Russell Colt, General Dry Batteries Co.; H. Blackett, National Screw & Mfg. Co.; G. R. Knapp, White Motor Co.; Bob Nieman, Ferro Machinery & Foundry Co.; Alex J. Paull, Cleveland Electric Illuminating Co.; J. F. Gedeon, Lamson & Sessions Co.; E. R. Pickford, Cleveland Graphite Bronze Co.; Harold Thomas, Warner & Swasey Co.; Walter G. Sites, assistant director, department of personnel development, Fenn college; and Joseph S. Kopas, director of that department

This is the first of two articles on an industry-college seminar in Cleveland on employment of war veterans. The second article will appear in an early issue.

f Servicemen

Industrial representatives pool thoughts and experience in placing returned fighting men in jobs and following through until correct adjustment is obtained. College aids in developing program

By VANCE BELL
Assistant Editor, STEEL

ful attitude toward other wives whose husbands were not called to war. The veteran's children have grown. His absence from home has not contributed to their considering him an important part of the family unit. This home is not the same as it was the day the veteran left for the training camp. He must bring himself up to date with conditions as they exist today. But the armed forces, which spent months to make him a fighting man, spend only a couple of days in preparing the man to return to civilian life.

Because of the importance of a job to a returned veteran he quickly will seek employment, probably with the company for which he worked before he entered service. So before a man has a chance to adjust himself to civilian life he is within a company's doors applying for a job.

The problem of re-employment of veterans is one of many facets calling for new approaches on the part of the employer. It is to help formulate a program for industry concerned with this problem and to train persons to co-ordinate activities under this program that Fenn college invited industry to take part in its current project.

Industry is paying 75 per cent of the cost of the Fenn veteran employment study project, and the remaining 25 per cent is being borne by the college, the Young Men's Christian Association, with which Fenn college is closely associated, and the Veterans Administration. Each participating company paid $500 for the development of the college's vocational testing and guidance laboratory and is paying $125 a month towards its operation.

The testing and guidance laboratory was developed as an integral part of the project to help obtain information about latent abilities and mental efficiencies so that the background, training, and experience of servicemen can be evaluated properly. The company representatives will gain experience and insight in techniques of testing, counseling, and guidance by observing in the laboratory where mechanical and other tests are administered. The laboratory is at the service of the participating companies, both as a work shop for the project participants and as a place where the companies may refer special problem cases which they may not be equipped to handle.

The laboratory is the official vocational advisement center in the Cleveland area for the Veterans Administration.

In establishing the project, Fenn college recognized that while industry's personnel people are well acquainted with the practical side of personnel work not many of them are professionally trained in the technical aspects of the job. The project supplements practical experience with professional training for an industrial representative to be the co-ordinator of the veterans program for his company. The program can be extended to include persons facing problems similar to those of the veteran. Through the project, the industrial representatives have opportunities to come into contact with the Veterans Administration and become familiar with the latter's program in aiding servicemen.

Fenn college benefits by enlargement of its facilities and an increased staff of qualified people for future guidance and instruction activities. The college benefits also from practical experience out of which other courses may be organized.

The Veterans Administration, which maintains an office at Fenn college's vocational testing and guidance laboratory, has an opportunity from the industry-college project to work closely with industry in aiding veterans to become re-established in civilian life.

In the course, every conceivable problem that might arise from employment of veterans is considered, and the reference section of the manual prepared in the course covers everything from a digest of laws applying to the veteran to copies of booklets issued by various firms relative to employment policies.

Commenting on the industry-college project, Warner Seely, secretary of Warner & Swasey Co., said, "Every employer, whether in a war industry or otherwise, has a responsibility both to his community and to his country to develop a sound plan for re-employment of returning veterans. Much has been written and discussion meetings are being held everywhere. Much confusion arises over the many ramifications of the subject.

"While no one company has yet been able to develop a veterans program which will meet all the needs, the group at Fenn college has made much progress in crystallizing the thinking on this whole subject. From it undoubtedly will come a pattern which will enable any employer to build his own program with a minimum of further effort," Mr. Seely predicted.

Fewer Working Days Cut Steel Product Shipments in February

Higher percentage of capacity engaged in most products during month. Movement in first two months of year down compared with like 1944 period, reflecting weather difficulties and manpower shortage

STEEL shipments in February, as reported by the American Iron & Steel Institute, New York, were less than in January because of fewer working days, but in most products a higher percentage of capacity was engaged as weather and transportation difficulties lessened.

Total shipments in February were 5,184,498 net tons, compared with 5,435,647 in January.

During 1943 the companies represented in the accompanying tabulation represented 98.9 per cent of total output of finished rolled steel products as reported to the Institute. The tabulation is accompanied by an explanation of the column headed "maximum annual potential capacity", as follows: Embraces total tonnage of each product that could be produced under full operations, assuming exclusive use of all available facilities and without regard to availability of ingots. For these types of rolling mills and other producing facilities which produce more than one product, the full capacity for each product is shown, regardless of the fact that such producing facilities have not capacity to produce the aggregate tonnage shown for all such products.

February shipments of sheared and universal plates were 713,634 tons, at 52.1 per cent of capacity, compared with 787,846 tons in January, at 53.3 per cent of capacity. Total shipments of hot-rolled bars in February were 773,275 tons, 57.6 per cent of capacity, against 802,070 tons, 56.1 per cent, in January. In hot-rolled sheets February shipments were 517,776 tons, 71.2 per cent, compared with 539,675 tons, 69.7 per cent, in January.

Shipments for two months this year totaled 10,616,482 tons, compared with 11,468,360 tons in the comparable period in 1944. Most of the loss was in January, when weather transportation difficulties and manpower shortage were keenest, though February this year also fell behind the same month last year.

Syracuse WMC Abandons Worker Referral Plan

As result of cutbacks in the munitions program, the referral plan of shifting workers from less essential to more essential industries is being abandoned by the War Manpower Commission at Syracuse, N. Y., according to Thomas J. Corcoran, area director.

Mr. Corcoran said the program, which had been in effect eight weeks, was discontinued because cancellation of war contracts have eased the area's labor shortage.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS
Period FEBRUARY - 1945

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production: Net Tons	Current Month: Production: Per cent of capacity	Current Month: Shipments (Net Tons): Total	Current Month: Shipments (Net Tons): To members of the industry for conversion into further finished products	To Date This Year: Production: Net Tons	To Date This Year: Production: Per cent of capacity	To Date This Year: Shipments (Net Tons): Total	To Date This Year: Shipments (Net Tons): To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	47	1	xxxx	xxxx	xxx	698,385	156,647	xxxx	xxx	1,395,768	351,392
Structural shapes (heavy)	12	2	9,580,550	262,982	38.1	261,688	xxxx	520,680	36.1	520,398	xxxx
Steel piling	3	3		17,292		18,745	xxxx	38,616		38,545	xxxx
Plates (sheared and universal)	27	4	17,841,320	712,939	52.1	713,634	49,724	1,520,755	52.7	1,501,480	94,681
Skelp	6	5	xxxx	xxxx	xxx	58,475	29,481	xxxx	xxx	115,996	77,549
Rails—Standard (over 60 lbs.)	4	6	3,669,000	178,286	63.3	179,758	xxxx	371,475	62.6	364,082	xxxx
—All other	5	7	512,000	13,362	34.0	13,982	xxxx	28,023	33.9	28,557	xxxx
Splice bars and tie plates	12	8	1,745,960	59,711	44.6	62,998	xxxx	124,348	44.1	128,605	xxxx
Track spikes	10	9	349,400	11,767	43.9	11,765	xxxx	25,123	44.5	25,539	xxxx
Hot Rolled Bars—Carbon	35	10	xxxx	683,531	xxx	540,703	75,738	1,405,083	xxx	1,085,319	168,863
—Reinforcing—New billet	13	11	xxxx	44,982	xxx	44,464	xxxx	102,433	xxx	97,271	xxxx
—Rerolled	13	12	xxxx	2,558	xxx	9,731	xxxx	10,992	xxx	14,078	xxxx
—Alloy	24	13	xxxx	246,988	xxx	178,377	15,787	518,744	xxx	378,748	40,942
—TOTAL	45	14	22,201,700	981,059	57.6	773,275	91,525	2,037,212	56.8	1,575,416	209,805
Cold Finished Bars—Carbon	23	15	xxxx	135,824	xxx	138,534	xxxx	286,558	xxx	282,023	xxxx
—Alloy	24	16	xxxx	37,044	xxx	34,408	xxxx	74,602	xxx	67,281	xxxx
—TOTAL	31	17	2,964,910	172,868	76.0	172,942	xxxx	361,160	75.3	352,334	xxxx
Tool steel bars	17	18	273,010	10,990	52.5	10,787	xxxx	22,154	50.2	22,346	xxxx
Pipe and Tubes—Butt weld	16	19	2,165,520	101,199	60.9	95,566	xxxx	214,340	61.2	205,269	xxxx
—Lap weld	8	20	830,200	32,928	51.7	30,019	xxxx	78,228	58.3	73,686	xxxx
—Electric weld	11	21	1,380,900	71,177	67.2	70,232	xxxx	150,439	67.4	146,667	xxxx
—Seamless	15	22	3,004,100	181,853	78.9	193,567	xxxx	385,903	79.5	393,337	xxxx
—Conduit	7	23	187,000	4,816	33.6	6,014	xxxx	12,205	40.4	13,459	xxxx
—Mechanical tubing	12	24	1,131,800	67,258	77.5	65,484	xxxx	138,759	75.8	133,345	xxxx
Wire rods	27	25	7,266,670	346,254	62.1	93,965	29,946	744,692	63.4	197,952	69,833
Wire—Drawn	41	26	5,664,690	285,454	65.7	173,022	9,298	610,102	66.6	357,713	19,223
—Nails and staples	19	27	1,253,360	47,746	49.7	48,194	xxxx	100,089	49.4	97,046	xxxx
—Barbed and twisted	13	28	539,610	18,590	44.9	18,670	xxxx	40,436	46.3	38,256	xxxx
—Woven wire fence	16	29	1,113,860	30,081	35.2	29,383	xxxx	65,116	36.2	61,539	xxxx
—Bale ties	12	30	149,780	5,792	50.4	6,253	xxxx	11,774	48.6	11,983	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	33,107	82	xxxx	xxx	69,285	82
—Chemically treated	8	32	465,000	12,081	33.9	9,320	xxxx	21,508	28.6	16,373	xxxx
Tin and Terne Plate—Hot dipped	10	33	3,799,850	160,012	55.0	152,705	xxxx	338,025	55.1	333,239	xxxx
—Electrolytic	10	34	2,251,850	63,225	36.9	54,415	xxxx	134,431	37.3	111,754	xxxx
Sheets—Hot rolled	30	35	19,197,320	1,049,252	71.2	517,776	22,004	2,185,806	70.4	1,057,457	53,266
—Cold rolled	12	36	7,131,460	331,732	60.6	190,155	xxxx	683,133	59.2	386,194	xxxx
—Galvanized	16	37	2,915,130	144,066	64.4	139,225	xxxx	296,268	62.9	278,053	xxxx
Strip—Hot rolled	24	38	7,055,390	219,367	40.5	138,028	19,414	440,241	38.6	276,249	40,402
—Cold rolled	35	39	3,119,850	108,439	45.3	106,790	xxxx	229,597	45.5	216,099	xxxx
Wheels (car, rolled steel)	5	40	319,400	24,642	100.6	22,034	xxxx	48,301	93.5	45,484	xxxx
Axles	6	41	408,170	11,275	36.0	11,148	xxxx	22,363	33.9	20,840	xxxx
All other	5	42	176,290	2,916	21.6	2,994	xxxx	6,140	21.5	6,117	xxxx
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	5,184,498	408,121	xxxx	xxx	10,616,482	916,233
Effective steel finishing capacity	152	44	67,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	92.5%	xxxx	xxxx	xxx	89.1%	xxxx

War Material Shipments to Soviet Union Exceed 16,250,000 Tons

Dollar value of supplies transferred to Russia from inception of lend-lease through February this year placed at $8,225,000,000. Shipments amount to 31.7 per cent of total to all Allies since October, 1941

LEND-LEASE shipments to the Soviet Union from the inception of the program in October, 1941, through February, 1945, totaled more than 16,250,000 short tons of war materials, including munitions, war production and other industrial materials and equipment, food and agricultural products, Leo T. Crowley, foreign economic administrator, reported last week.

With exception of some cash purchases and some materials lend-leased by Canada or transferred by the British in this hemisphere to the Soviet, all of this was provided by the United States as lend-lease to aid the Soviet war effort.

The total tonnage shipped is exclusive of thousands of aircraft flight-delivered, by American and Russian pilots, from points in the western hemisphere to Russian airfields or to delivery points in the Middle East, whence they were flown into Russia.

The dollar value of the supplies transferred by the United States to the Soviet Union through February of this year is $8,225,000,000. In addition, we supplied war services to the Soviet such as ferrying of planes and transportation, which were valued at $515,000,000. Transfers to the Soviet Union thus far have totaled 31.7 per cent of our transfers to all of our allies since the inception of lend-lease. Of the total of materials transferred, finished munitions valued at $3,980,000,000 represented 48.21 per cent, war production and other similar industrial equipment and materials valued at $2,820,000,000 represented 34.16 per cent, and food and other agricultural products $1,455,000,000 or 17.63 per cent.

Aid from U. S. Increases

A comparison of the year-by-year totals of aid to the Soviet Union indicates its growing importance. In the three months of 1941 during which we sent lend-lease aid to the Soviet Union, it totaled 217,280 tons. In 1942, its first full year, it rose to 2,764,000 tons, then to 5,369,000 tons in 1943 and to 6,964,000 tons in 1944. In January and February of the current year we sent 960,000 tons.

We have sent to the Soviet Union under lend-lease 13,000 planes, the largest total to any ally. We have also sent 12,850 combat vehicles, including medium and light tanks, self-propelled guns, half tracks and armored scout cars, 1900 ordnance service vehicles and about 50,000 jeeps.

In addition to the jeeps and other combat and motor vehicles, we have sent more than 308,000 trucks ranging all the way from ¾-ton trucks to those of five tons and over; some 2350 engines for trucks, and about 37,000 other vehicles, such as motorcycles and track-laying tractors. American trucks furnished under lend-lease have carried more than one-half the supplies required by the Soviet troops on some sections of the Eastern front.

In artillery and ammunition we have sent more than 135,000 submachine guns, some 13,000 pistols and revolvers, more than 8200 antiaircraft guns, and more than 306,000 tons of explosives consisting of such items as smokeless powder, TNT, and dynamite.

Signal equipment valued at more than $170,000,000 has been delivered to the U.S.S.R.

In the field of transportation equipment we have sent 1355 steam locomotives, 50 diesel-electric locomotives, 9272 flat cars, a thousand dump cars, a hundred tank cars and 24 heavy machinery cars. Practically all of these have been since January, 1944, when we undertook to help solve the critical problems of transportation resulting from the vastly extended supply lines of the Soviet armies pressing the fleeing Nazi armies toward the Balkans and the German border.

Naval and marine equipment from the United States to the U.S.S.R. supplied under lend-lease has included submarine chasers, torpedo boats, mine sweepers and landing craft, marine propulsion machinery such as marine diesel engines and marine gasoline engines, salvage stations and diving gear, jetting apparatus, submarine rescue chambers, electric equipment for vessels and 3000 pneumatic floats and tug boats. Naval artillery and ammunition supplied to the Soviet Union has included Oerlikon guns, D.D. guns and .50 caliber machine guns.

Foodstuffs supplied for the use of Soviet armies have consisted in the main, on a quantity basis, of grains and cereals, sugar and canned meats.

Industrial equipment for war production purposes furnished under lend-lease has included such items as engines and turbines, compressors, bearings, machine tools and similar equipment. We have also sent for war production needs raw materials such as steel, ferroalloys, and nonferrous metals, such as copper and molybdenum.

POSTWAR PREVIEWS

VETERANS RE-EMPLOYMENT—Seminar of Cleveland industrial representatives studying placing and adjusting of returned servicemen. Results of research may aid other employers in fitting veterans into industry. See page 64.

CONTRACT TERMINATION—Advance planning by management for termination financing urged by Navy procurement official. Close cooperation between industry and government agencies necessary to bridge gap from war to peace. See page 71.

WEST COAST—Five-point program to promote western iron and steel industry after the war adopted by San Francisco group. See page 81.

AIRCRAFT—Majority of postwar commercial airliners will be approximately of the size now in operation. Personal flying will increase, but to limited extent. See page 82.

WELDING ROD PLANT—Continuous production of manganese alloy electrodes delivers rods to final inspection station at rate of 350 per minute. Elimination of manual handling will speed production and reduce costs. See page 97.

STRESS RELIEF FOR WELDMENTS—New method employing controlled, low temperatures to relieve transverse and longitudinal stresses in welded structures has become important factor in vessel construction. Durability and safety provided at low cost. See page 110.

Cost Absorption Prime Principle Of Price Control, Says OPA Chief

Bowles says methods for applying cost absorption now are definite for wholesale and retail business. Principle will continue important in pricing policy during reconversion period. Many cost-reducing factors found operating in wartime

By CHESTER BOWLES
Administrator, Office of Price Administration

THIS is a good time, it seems to me, to look at the results of the battle against inflation and to map strategy for the coming fight against this ever-strengthening enemy. Since the hold-the-line order in May, 1943, the cost of living has risen only 1.6 per cent. OPA is proud of this record, a record that could not have been achieved without the aid of business and the public.

Even though the rise in the total cost of living is a small percentage, there is no reason for over-confidence regarding the task to come in 1945. The difficult job of holding the line against inflation continues to require teamwork between OPA and business. It will require the help of all American-housekeepers, farmers, laborers, office workers—for the savings, investment plans and living standards of all are at stake.

The pressure of inflation increases with the length of the war. Some manufacturing costs are rising and careful planning and pricing are necessary to minimize price increases to consumers in order to forestall a general inflationary rise in prices. With decisive battles still ahead on the war fronts, increases of supplies to civilians cannot be expected. We are facing some of the actual shortages that were predicted in the early part of the war. The excess of the public's income over goods and services available reached $38 billion in 1944 and is still growing.

At the same time, the income of the people continues to rise. There is the huge backlog of savings which has increased more than $100 billion during the war. Checking accounts in banks amount to more than $60 billion, $33 billion more than in 1939.

Vigilant price control is necessary if this money is not greatly reduced in value through competition for scarce goods. If prices become higher and higher, dollars buy less and less. Most business men realize how quickly they would be involved in such disastrous inflation. An inventory boom could get going bringing a collapse of values and disappearance of profits. Business men would have no sound basis for planning peacetime production and selling. They would be at the mercy of an unstable price situation.

This situation is what Congress sought to avoid when it enacted the Price Control act. Price stabilization is of prime importance to business men, for they must plan enterprises of the future.

Of course, there is the business man who reads the headlines some morning when the war news looks good, contemplates the tempting purchasing potentiality, and concludes that OPA is a diabolic agency set up to control his profits.

OPA does have a definite purpose. It is not to control profits. It is not to keep people from spending their money. It is to control prices. Working increasingly with business, OPA has been able to come a long way toward its goal by using definite pricing standards. We must continue to apply these standards if the price stabilization we have achieved is to be maintained.

As you know, OPA is bound to allow ceiling prices high enough to maintain overall earnings before taxes for an industry at least equal to its earnings in a normal peacetime period. This is the industry earnings standard. In controlling prices, we have to talk about profits because prices and costs govern profits. Actually, the use of the industry earnings standard in determining when an industry needs a price adjustment puts a floor under profits.

Product Standard Also Used

In addition to the industry earnings standard, a product standard is applied to insure fair and equitable prices on a particular product sold by a multi-product industry.

Two other factors complete our pricing policy. They are special pricing standards set by law for agricultural commodities and products made from them and pricing worked out with other war agencies in order to secure the maximum production of vital war and civilian supplies.

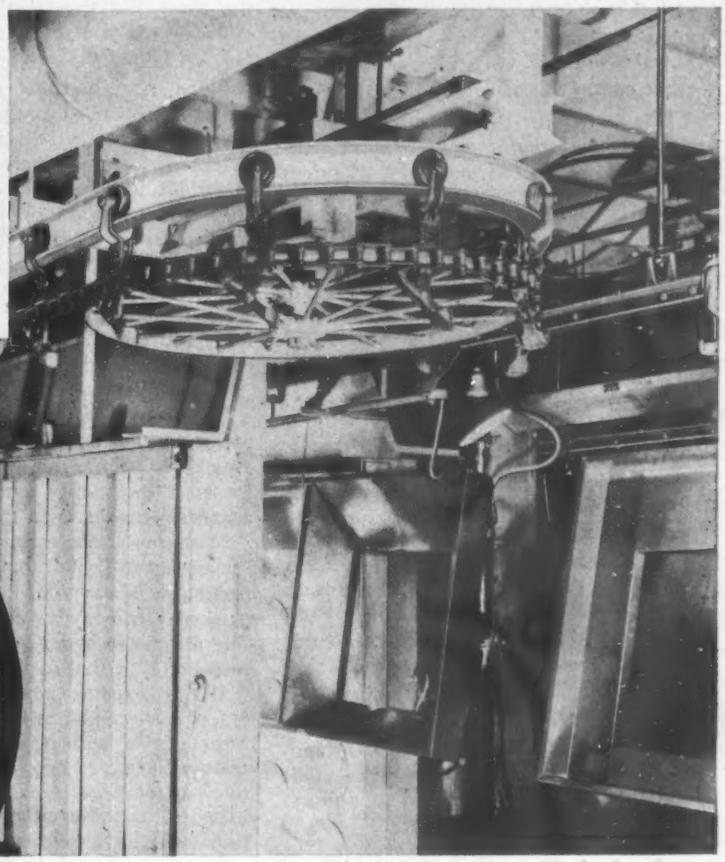
At OPA we have followed this policy consistently, keeping always in mind our fundamental purpose, to stabilize prices. We would be failing in our purpose if we did not examine carefully every request for price increases, however small, to prevent all price increases not called for by our standards.

The success in holding the cost of living down is due largely to a 3.9 per cent decrease since May, 1943, in the retail price of food, for food is about 40 per cent of the average family budget. Rents remained relatively stable, but all

STUDY ELECTRONICS: Members of the International Brotherhood of Electrical Workers in Philadelphia are finding out what makes electronics tick in classes conducted by Temple University. Above, E. C. Hubbert demonstrates the Westinghouse precipitron to a small group of workers

AMERICAN MONORAIL with Infra-Red Ovens CUTS BAKING TIME 70%

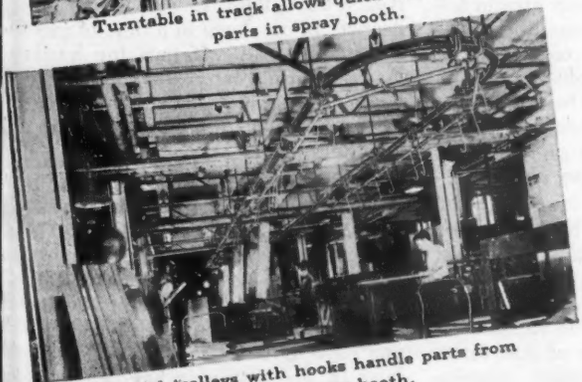
Storage bank on tracks assures supply of parts to sprayer.



Pusher feeds sprayed parts through oven on monorail to wrapper.

$1925.00 SYSTEM CARRIES PARTS FROM WELDERS THROUGH STORAGE, SPRAY AND OVENS TO WRAPPER

Turntable in track allows quick movement of parts in spray booth.



Special trolleys with hooks handle parts from welders to spray booth.

A well known furnace manufacturer has eliminated the bottle-neck in their enameling section with the use of infra-red drying and American MonoRail Overhead Handling System. Where casing sections would pile up in the spray booth, often requiring over 30 minutes—it now takes only 8½ minutes to bake the finishes.

American MonoRail synchronizes all pre-baking operations with baking time. The system extends from the sheet metal section, through spraying, baking, wrapping and returns to fabricating and welding stations. A turntable in the track permits reversing of carriers holding the pieces so that operator may spray all sides without touching the sprayed surfaces.

Our engineers will gladly show you how your products can be carried at the lowest possible cost and the highest possible efficiency.

THE AMERICAN MONORAIL CO.
13102 ATHENS AVENUE CLEVELAND 7, OHIO

other cost-of-living items increased. Clothing prices to the consumer rose almost 11.6 per cent, house-furnishing prices rose 14.3 per cent.

Clearly, to hold down the pressure of inflation, OPA must not only maintain every bit of tight control on food prices but also must improve its controls of all other commodities.

The pricing policy of OPA is not simply a cost-plus formula whereby every increase in wage rates and material prices are matched dollar for dollar by a corresponding increase in price ceilings at each succeeding level of production or distribution. Such a practice would not be price control. Costs would be bound to chase each price increase.

Cost absorption is the prime principle of price control. A number of consequences of wartime business makes its use possible.

Wartime conditions and wartime volume make possible the absorption of some actual cost increases.

This principle of requiring absorption of cost increases has been used by OPA in fixing price ceilings at the manufacturers' level practically since Pearl Harbor. It is not a new price control theory. From time to time, wholesalers and retailers have been required to absorb cost increases.

Still OPA has not in the past had standards of cost absorption for wholesalers and retailers as definite and as uniform as those for the manufacturer.

Standards Have Been Worked Out

Definite cost absorption standards for distributive trades have now been worked out, for it would be unfair to the manufacturer and the consumer to continue price control without them. This year James Brownlee, deputy price administrator, and I presented these standards to the Senate Banking and Currency Committee. I am convinced these standards are fair to all concerned and will not require the distributive trades to shoulder an unreasonable burden as their share of cost absorption.

The industry earnings standard is met if the profits before taxes are as high as those of the designated peacetime period.

The second standard, the product standard, is a more important and complicated factor to be considered in determining the ability of the distributive trades to absorb cost increases. It is the standard applied to trades selling a number of commodities so that the overall earning of the trade will not be the sole measure for setting the price of any given commodity.

When suppliers' prices increase, OPA's stand is that higher price ceiling of the wholesaler and retailer should occur only if the absorption of suppliers' price increases would reduce margins on commodities below the average cost of doing business.

Cost accounting is usually done on a store-wide or departmental basis. Store figures show what it costs to run an entire store, but they don't show what it costs to sell a kitchen table, a suit of clothes, or a toothbrush.

Since store-by-store operating costs are available, the average overall operating expense of an entire trade can be determined. The operating expense is important in measuring capacity to absorb cost on separate commodities. Expressed as a percentage of net sales, it is the overall "expense rate" which we use as a gage to measure capacity of a particular group of sellers to absorb cost increases on a product.

Must Consider Margin on Commodity

The second factor to be considered along with "expense rate" is the margin on a commodity. Here again, the margin for each commodity must be the representative margin for a trade as a whole.

With these two percentages, the trade's "expense rate" and the trade's margin, maximum absorption capacity on any particular commodity can be computed. The difference between margin and "expense rate" is that capacity.

If the "expense rate" and the margin are equal, no absorption of a manufacturers' price will be required. If the margin is already below the "expense rate" at the time of manufacturers' price increase, no absorption of the higher price will be required, but neither will sellers be allowed to increase margins to equal the "expense rate." Previous margins will remain unchanged.

A second consideration we must always keep in mind in applying cost absorption on a trade-wide basis is how special trade groups will fare. When a supplier's price goes up on a particular commodity or line, there is sometimes a group of sellers who obtain the major part of volume from that commodity or line. The practice is that price increases will be granted where necessary to prevent any significant group of sellers from suffering overall hardship.

Some wholesalers and retailers may become alarmed at the possibility of cost absorption equal to the difference between operating expenses and margin being required on some commodities. Anticipating such absorption on item after item, they foresee all profits vanishing. It must be remembered, however, that the industry earnings standard also still applies, assuring the trade profits before taxes at least equal to those of a peacetime period.

Retail furniture stores had a 33 per cent "expense rate" and a 44 per cent overall gross margin when they were required to absorb manufacturers' prices on wooden furniture equal to about 3 per cent of their selling prices of that furniture. After this absorption, margins were reduced, but net profits before taxes were still far above those of peacetime.

This industry earnings standard does not, however, put government in the position of guaranteeing every individual business a profit regardless of its efficiency. There were business failures long before price control.

Because of the wide variety of margins on some commodities, an individual-firm basis for cost absorption is applied. On the firm basis, absorption of a supplier's price increase on a particular commodity will not be required when such absorption would reduce the margin below the operating "expense rate" of the firm. In such instances, the "expense rate" used is the seller's own.

Again we have to consider the "ifs" of this complicated problem. If cost absorption is required on a commodity selling at relatively similar margins in all stores including those of freeze type of historical margin control, such absorption would be made on a trade-wide basis.

The trade-wide "expense rate" is used as a measure for cost absorption on commodities sold under relatively uniform margins. The individual firm's "expense rate" is used for commodities having widely divergent margins.

If the increase in a manufacturer's price is so small that it would place the margins of few, if any, sellers below the "expense rate", all sellers would be required to absorb the small increase.

General Facts To Remember

General facts to be remembered about cost absorption on particular products are that absorption will not reduce margins below the cost of doing business of an entire trade, and, if margins are not uniform on a product, below a firm's cost of doing business.

No absorption is required if a manufacturer's price increases on a commodity being sold on a margin equal or below the "expense rate." There will be no changes in margins.

The wholesaler and retailer combined will often have a capacity to absorb more than the manufacturer's price increase. In that case, OPA will determine the fair amount each should absorb, using the standards just outlined.

Cost absorption is one of the requirements OPA must follow in its job of keeping prices down in a time of increasing supply costs. It puts the businessman in partnership with OPA in keeping operating costs down, thus keeping prices down to a generally fair and equitable point.

Unless we use standards to see that prices are generally fair and equitable now and in the difficult months ahead, we cannot hope for orderly transition into a sound postwar economy. Business men are vitally concerned with that transfer, and the objective aid which you have given us in working out problems in the past year has been invaluable.

Termination Financing Requires Advance Planning by Management

Gap between war work and peacetime production can be bridged financially only by careful preparation. Each contractor urged to put his house in order to effect prompt settlement of claims and facilitate interim financing machinery

By Rear Adm. H. L. Merring

UNDER the pressing necessities of war, our government has taken an increasingly active part in the financing of industry. The banks of the country have performed well their financing function, but the war production job called for financing at a pace and on a scale outside the proper areas of private financing.

In four years, for instance, the industry of our nation has invested more than $20 billion in new and expanded industrial plant. Approximately three-quarters of this expansion was financed by the government. With the urgent need for munitions and equipment on the fighting fronts, the government itself took on a large share of the responsibility for the financing operation. Speed was vital. It was essential that the industrialists concentrate their energies on getting more and more production rather than on the equally important function of finance. If the war plant needed financing, the Army or the Navy saw to it that financing was provided.

The war contractor who is shifting from one war job to another still feels quite sure of the financial aspects of the shift. But each corporation must look forward to the time when its last war contract is terminated. At that moment —actually long before that in most cases —private financing of private industry again becomes a major concern of management. And every corporation should be planning ahead today for the bridge that will carry it across the gap from one war job to another or from war work to peacetime production—whether that bridge is founded on unexpended war savings, on some form of government furnished or guaranteed interim financing, or on private financing.

For management, the time has come to plan financial policies for reconversion. This does not mean that the war is over —not by a long way. But individual companies still may see their war work ending in the months to come.

Having spurred industry to the amazing expansion which was necessary to provide fighting tools for our soldiers and sailors, the Army and Navy accept responsibility to help industry adjust from wartime to peacetime production. We believe that, for many companies, however, the gap between war work and peacetime production can be bridged financially only by careful advance planning on the part of management itself.

As a minimum, the gap is the time lag between the day a war contract is terminated and the day when a claim against the government is paid. The Army and Navy are working hard to make that time lag as small as possible. But no matter how successful they are, there always will be a time lag. Two months? Four months? Six months? It depends partly on us, and partly on you —on the size and intricacy of your contract, on your advance preparations or lack of preparations for contract settlement. If you are a subcontractor, it depends on still other factors over which you have little control—the co-operation of the companies that stand between you and your government in the contractual chain.

So every corporation should be studying carefully its working capital position. It should be asking this kind of a question: Can we bridge the financial gap between contract termination and contract settlement if our war work is cut back 30 per cent (60 per cent) (100 per cent), and the time lag is 60 days (four months) (six months)? This two-pronged question is the realistic issue in future finance; and its answer may mean the difference between solvency and bankruptcy for many firms. It is particularly pertinent to a corporation with large renegotiation or income tax liabilities.

Army and Navy Will Help

With that question in mind, I should like to discuss the ways in which the Army and Navy are prepared to help you over the gap . . . whether the gap is a pause between war jobs or the big jump from war work to peacetime production.

Experience has convinced us in the service that every war contractor should be planning in advance for contract termination—setting up a termination unit on his staff, acquainting himself and his key personnel with the things that must be done when termination comes. But even if you cannot plan fully in advance for termination, you can take the first step of setting your financial house in order.

Many corporations, of course, have built up a solid capital reserve, and can finance themselves through the days after termination of a war contract. Many corporations, too, will find the banks which assisted them in entering war production equally willing to make straight commercial loans available for reconversion.

REAR ADM. H. L. MERRING

To meet the needs of as many businesses as possible, however, the Army and Navy have established special "interim financing" devices. They are not intended to finance reconversion as such, but are designed to see the contractor through the gap between termination and the payment of his claim against the government. They may be summarized under two headings: Partial payments, and T-loans.

Government Guarantees T-Loans

Termination loans are made by the commercial banks of the country, and guaranteed by the government. The war contractor makes application for such a loan directly to his local bank. No matter where a war contractor stands in the contractual chain, he can arrange a T-loan to finance him over the gap between termination and payment of his claim. What is more, he can arrange a firm commitment for such a loan with his banker now, assuring himself in advance that a T-loan will be ready for him when termination comes. For arranging a T-loan in advance, the banker may charge a commitment fee of not more than one-fourth of 1 per cent of the unused balance of the credit involved, or a flat fee of not more than $50. This is a small premium for the insurance of adequate cash and non-frozen inventories.

The size of the T-loan commitment is gaged by the amount of the contractor's investment in terminated war contracts. Interest is charged at a rate not in excess of 4½ per cent a year. In order to obtain advances under a T-loan the contractor need only present to the bank a certificate setting forth his own estimate of the value of his termination claim. He can then obtain an amount equal to an agreed percentage of this estimate.

In addition to the commercial banks,

This article on termination financing was prepared especially for STEEL by Rear Adm. Merring. The author is deputy chief, Industrial Readjustment Branch, Office of Procurement and Material, Navy Department.

the RFC and Smaller War Plants Corp. also are authorized to make these T-loans.

Partial payments are available to all war contractors, but are best adapted to the needs of prime contractors and first-tier subcontractors. Because an application for a partial payment must pass up the contractual chain, considerable delay may be experienced by a lower-tier contractor.

It is necessary to wait until your contract is terminated to negotiate for a partial payment. But if you will need a partial payment when termination comes, you should lay the groundwork by discussing the question now, with your contracting officer (if you are a prime) or with your prime contractor (if you are a sub). In such advance discussions, it should be possible to estimate the amounts which will be required (based on costs of estimated inventory, including 'raw material and work-in-process, allocable to the terminated portion of the contract at specific stages of completion). Such an estimate will not be binding on the contracting officer or contractor, but will serve as a basis for quick handling of the financing problem when the time comes.

Partial payments become available to a war contractor upon termination of his contract, and will be made within 30 days after a proper application has been filed with the War or Navy Department.

There are two main types of partial payments: (1) Immediate partial payments and (2) cost-supported partial payments.

Floor and Ceiling on Payments

Immediate partial payments are based on the contractor's own estimate of his costs under the terminated contract. In order to make this device serve the needs of industry, we have put a floor, as well as a ceiling, on these payments. An immediate payment may be obtained in a sum not less than 75 per cent of the contractor's estimate of certain of his costs, and not more than 90 per cent of all his costs excluding profit. The contractor's application for an immediate payment is forwarded to the contracting officer and, if he approves, to the disbursing officer for payment.

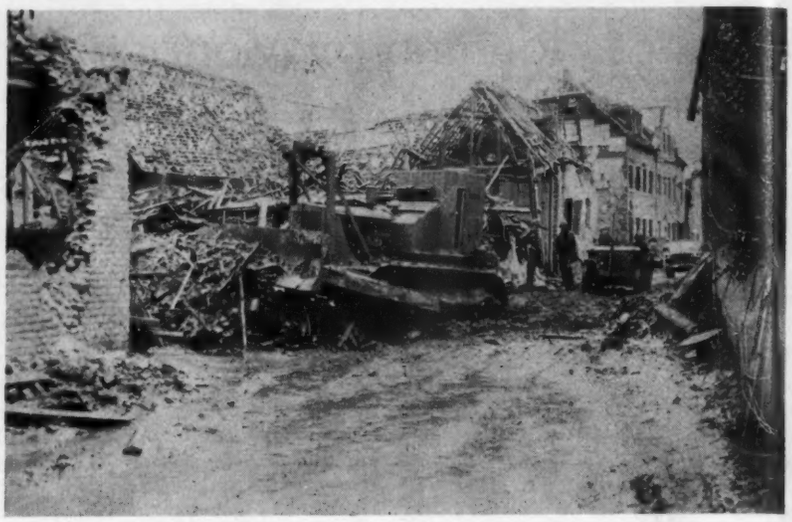
Cost-supported partial payments may be made for 100 per cent of the contract price of the contractor's acceptable finished products and 90 per cent of the cost of raw materials and work in process, plus a reasonable percentage of other costs. The cost data necessary for such a payment is similar to that required in the settlement of the terminated contract, so that the contractor is not duplicating his work in applying for a cost-supported payment.

A prime contractor who has been delegated authority to settle subcontractor claims not in excess of $10,000 also may make a special request for a partial payment fund to reimburse his subcontractors. In this case, he estimates the total amount of subcontractor's claims and requests for partial payments, and submits a special letter request to the contracting officer. This application must include his agreement to perform certain acts and to account to the department for the use of the funds. If the request is approved, the funds are placed in a separate bank account and used to meet subcontractor's requests for either partial or final payments on account of their termination claims.

Another device for speeding payment to subcontractors is under consideration by the services and the Office of Contract Settlement now. This is a revolving fund from which the prime contractor would pay subs' claims under any terminated war contract, regardless of what Navy bureau or Army technical service was involved. The fund would be provided to the prime as a direct loan. It would revolve as settlements or partial payments on account of payments made from the fund were redeposited in the special account.

These are the special devices which your government—through the co-operation of the Office of Contract Settlement, the Army and the Navy—have provided to help you over a potentially difficult period in the life of your business. In addition provision has or can be made in the agreements covering government financing during production to use advance payments or V-loans against the contractor's termination claim. We are constantly studying the problems involved in speeding the settlement of contractor's claims and in getting financial aid to those who need it. Difficult legal and administrative problems must be grappled with. But we hope that we may be able to announce further developments in this field in the near future.

Meanwhile, I should like to stress the importance to our whole nation of each war contractor accepting his own personal responsibility in preparing his own business for the days to come. Nowhere is this more clear than in the field of finance. Each corporation must take the initiative in preparing its own financial structure for future tests, and must maintain adequate records so that it will be in a position to settle its potential termination claims promptly and to obtain immediate interim financing pending such settlement.



CLEARING THE WAY: Caterpillar diesel tractor with armored operator's cab and LeTourneau bulldozer clears rubble and debris from the streets of Gereonsweiler, Germany, for the advance of tanks to support the American Ninth Army infantry positions. Signal Corps photo

134 Used Machine Tools Offered by Government

Descriptive lists of 134 used machine tools costing $1,123,990 and all more than ten years old, which have been declared surplus at the Watervliet Arsenal, New York, have been mailed to 20,000 war contractors and other manufacturers in the regions served by the Reconstruction Finance Corp.'s Disposing Loan Agency at New York.

T. J. Ahearn Jr., manager of the agency, announced that a new method had been established for the sale, which if it results in wide distribution of the items offered, will be followed by RFC in future offerings. The tools were available for inspection at the Watervliet Arsenal. Detailed descriptive lists of them were distributed through RFC disposing loan agencies. Bids for the tools will be opened April 24.

PRIORITIES–ALLOCATIONS–PRICES

Weekly summaries of orders and regulations, together with official interpretations and directives issued by War Production Board and Office of Price Administration

CMP REGULATIONS

PRIORITY STATUS: War Production Board has amended direction 54 to CMP 1 which controls the operation of deferred allotments, to permit a customer to revalidate a canceled Z order if he has an allotment for a later quarter. This will permit customer to retain his priority status over other Z orders that were originally placed later than his original order. (Direction 54, CMP Reg. 1).

CRITICAL MATERIALS: A series of amendments to CMP reg. 4, which defines the operation of preference ratings under CMP effected by WPB. Present blanket permission to sell certain types of aluminum and copper materials on Z-IE orders is replaced by provisions requiring specific authorizations before sale. This makes it possible to prevent disposition of certain critical items, particularly stranded copper wire, on Z-IE orders and at the same time frees idle and obsolete stocks that cannot be disposed of otherwise by warehouses. (CMP Reg. 4).

EXCESS MATERIALS: Procuring agencies may now authorize contractors to purchase idle or excess materials up to their contract requirements for use in the same major program that the selling contractor was engaged in. Action is taken under amendments to Inventory Direction 17 to Controlled Materials Plan regulation No. 2 and direction 3 to Priorities Regulation No. 17.

STEEL SUPPLIES: Amounts of steel, in CMP forms, for maintenance, repair and operating supplies for public sanitary sewerage facilities during second quarter reduced. Operator is limited to 80 per cent of steel in controlled material forms purchased for second quarter of 1944. New limitation does not apply to those using less than ten tons of carbon steel and two tons of alloy steel during the quarter. (Direction 1 to order P-141).

L ORDERS

FURNITURE: Rules under which manufacturers may substitute metal parts, such as swivel irons, table tops or bed rails, for wooden ones are clarified through amendment of interpretation 2 to limitation order L-260-a. As explained in the amended interpretation, L-260-a permits metal parts to be used for wooden ones only to the extent the substitution does not cause an increase in the dollar value of furniture made in any quarter over the value of that authorized for production in the fourth quarter of 1944. (L-260-a).

MOTORCYCLES: Applications for delivery of motorcycles for use in Canada or to the Canadian government must be accompanied by the written approval of the motor vehicle controller of Canada, under an amendment to limitation order L-331. Such approval was formerly required but was not so stated in the order. (L-331).

PHYSICAL THERAPY EQUIPMENT: Definitions of infra-red generators and ultra-violet radiation equipment covered by Order L-259 have been clarified to avoid confusion with a recently developed infra-red limb bulb designed primarily for industrial drying. (L-259).

DOMESTIC ICE REFRIGERATORS: Quotas for production of 74,000 domestic ice refrigerators in the second quarter to meet military and essential civilian requirements have been assigned to 17 manufacturers (Schedule XI to L-7-c). Additional authorizations for production of 1000 more units, to be assigned later, will bring second-quarter authorized production to 75,000. (L-7-c).

SCALES, BALANCES AND WEIGHTS: Order L-190 has been amended to provide for assignment of preference ratings for purchase of scales, balances and weights when needed in an emergency. (L-190).

M ORDERS

CADMIUM: New restrictions have been imposed on use of cadmium in amended conservation order M-65. In amended order, effective April 13, purchasers must certify the metal will be used for permissive purposes under the order. Producers may not sell a cadmium-containing or cadmium-plated product unless they receive from the purchaser a certification that the items will be used for a specific purpose permitted under the order. (M-65).

WOODWORKING MACHINERY: An amendment of General Industrial Division Table 6, order M-293, designed to speed up delivery of the more essential unfilled rated orders for certain types of equipment has been effected. Under the amendment, subdivisions 13 and 14 of table 6 are combined. Added to the new subdivision 13 are certain types of woodworking machinery, nailing machines, wood box printers, planers and matchers, and double surfacers. M-293).

P ORDERS

EXPORTS: Exporters are permitted to use a preference rating without filing an application on certain small orders for materials to be exported for use as maintenance, repair and operating supplies in new preference rating order P-151. The new order incorporates provisions that formerly appeared in Direction 53 to CMP Regulation No. 1. This latter has been revoked. It allowed exporters to use an allotment symbol to get small amounts of controlled materials (steel, copper and aluminum) to be exported for use as maintenance, repair and operating supplies. (P-151).

MAINTENANCE STEEL: Use of steel for maintenance, repair and operating supplies for the chemicals industry is limited in second quarter to 80 per cent of the quantity used for the corresponding period of 1944 through direction 1 to preference rating P-89, governing maintenance, repair and operating supplies for the industry. Exempted from the restrictions are companies ordering for second quarter delivery less than 10 tons of carbon steel and two tons of alloy steel. (P-89).

EQUIPMENT: Use of preference ratings to obtain new equipment, as condensing units, cabinets and systems, is prohibited in direction 1 of P-126. Also prohibited is delivery except for hermetically sealed unit for emergency replacement. (P-126).

U ORDER

STEEL PIPE: Direction 4 to utilities order U-1 limits the amount of steel pipe for maintenance and repair and for minor plant additions that utilities may schedule for delivery during the second quarter of 1945 to 20 per cent of 1944 steel pipe deliveries. An exception in the directive provides that utilities may schedule up to 10 tons of pipe without cut from last year's rate.

PRICE REGULATIONS

MACHINES, PARTS: Pricing of machines, parts, industrial equipment, industrial services and industrial machinery services has been simplified by issuance of a new regulation and the revision of an old one. MPR-136 has been revised, RMPR 136 becoming effective March 31. Although the general level of maximum prices is not changed, the revised regulation somewhat changes coverage, reports, records, pricing methods, and depreciation classifications for secondhand products. Industrial services are now under a new regulation, MPR-581, also effective March 31. The supply of installation and erection services by manufacturers has been placed under RMPR-251 so that manufacturers who install machinery are on the same basis as contractors who install machinery. (MPR-136, RMPR-136, MPR-581, RMPR-251).

WRENCHES: Dollar-and-cent ceiling prices have been established for two special-type wrenches, in new condition, that the Navy proposes to sell for civilian use. While it is expected the wrenches will be disposed of mainly in wholesale channels, retail ceiling prices of $1 each for the small wrench and $2 each for the larger wrench. The wrenches are described as double open and engineer types, made of alloy steel, with head openings milled to close tolerance. Approximately 4400 of the small wrenches and 8500 of the large ones are being offered for sale by the Navy at Seattle. (Order No. 47 under Supplementary order 94—special maximum prices for certain open end wrenches—effective April 9).

Program for New Transit Vehicles in 1946 Announced

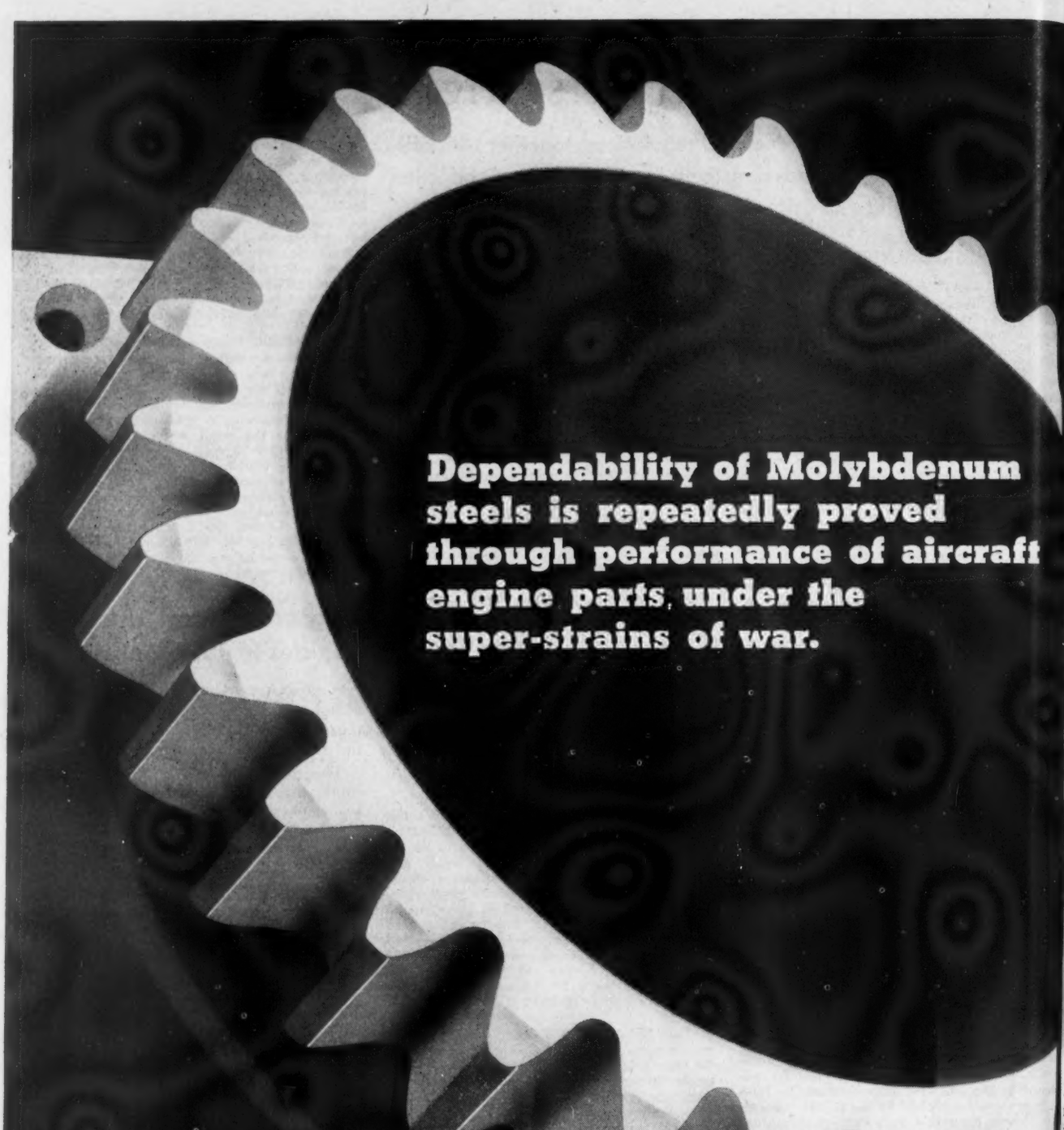
A program for manufacture of transit vehicles in 1946 has been announced by the transportation equipment division of the War Production Board.

The program provides approved 1946 production schedules for street cars, trolley coaches, integral buses and bus bodies for the following five claimant agencies: Office of Defense Transportation, Army, Navy, Foreign Economic Administration, and Canada. The production schedules for 1946 call for 300 street cars, 348 trolley coaches, 9733 integral buses, and 12,052 bus bodies. Production schedules for 1945 are 639 street cars, 348 trolley coaches, 9413 integral buses, and 12,700 bus bodies.

AWARDS . . .

For excellence in manufacture of war materials the following firms have received the Army-Navy "E" award:

Burgess-Norton Mfg. Co., Geneva, Ill.
DeVilbiss Co., Toledo, O.
Executone Inc., New York.
Federal Mfg. & Engineering Co., Brooklyn, N. Y.
Walter Kidde & Co. Inc., New York.
Lodge & Shipley Machine Tool Co., Cincinnati.
Metals Refining Co. division, Glidden Co., Hammond, Ind.
Mid-West Forging & Mfg. Co., Chicago.
Plomb Tool Co., Los Angeles.
United States Spring & Bumper Co., Los Angeles.
Wales-Strippit Corp., North Tonawanda, N. Y.
Andover-Kent Aviation Corp., Andover Motors Corp., Elmira, N. Y.
Boston Wire Stitcher Co., East Greenwich plant, East Greenwich, R. I.
Buchmann Spark-Wheel Corp., Long Island City, N. Y.
Continental Can Co., McDonald plants Nos. 33 and 77, Chicago.
Diamond Tool Research Co., New York.
Electro Metallurgical Co., Plancor 757, Ashtabula plant, Ashtabula, O.


Dependability of Molybdenum steels is repeatedly proved through performance of aircraft engine parts, under the super-strains of war.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Increasing progress on automotive reconversion planning being made at policy level, but considerable time will be required to translate this to operational level. Priorities on machine tools need clarification

DETROIT

WHEN the first stunning shock at the sudden death of Mr. Roosevelt had eased, the motor industry began to take stock of the situation in the effort to determine how the future might be changed under the new President. There seemed to be general concurrence with Washington opinion looking toward a little more conservatism in the executive branch, toward more consolidation of government direction in the hands of the Congress, toward further rise in the stock of business men in government circles, and above all toward a successful prosecution of the war to a fast and victorious conclusion.

A considerable amount of speculation as to possible cabinet changes has made the rounds, and of principal interest to Detroit is the report mentioning K. T. Keller, president of Chrysler Corp., as a possible eventual successor to Mr. Stimson as secretary of war. While Mr. Keller has never expressed any political aspirations, he is held in high regard in military circles, especially in the ordnance department. His stand for continued progress in well-financed ordnance research and development after the war is well known.

Progress Made at Policy Level

On the score of automobile plant reconversion, increasing progress is being made at what might be called the policy level, but it will take considerable time to translate this to the operational level. For example, the WPB has approved the ordering of $50 million worth of new machine tools, including some 5000 units on a screened list of bottleneck items which are essential to reconversion and have a "lead" time of from three to seven months for construction. This approval is understood to take the form of granting an AA-3 priority to such items, but this will require further clarification, since virtually all machine tools now on order carry an AA-3 priority. This is further broken down into a dozen or more urgency ratings under this priority, and where the automotive tools may fall on this "priority within a priority" list is not yet known.

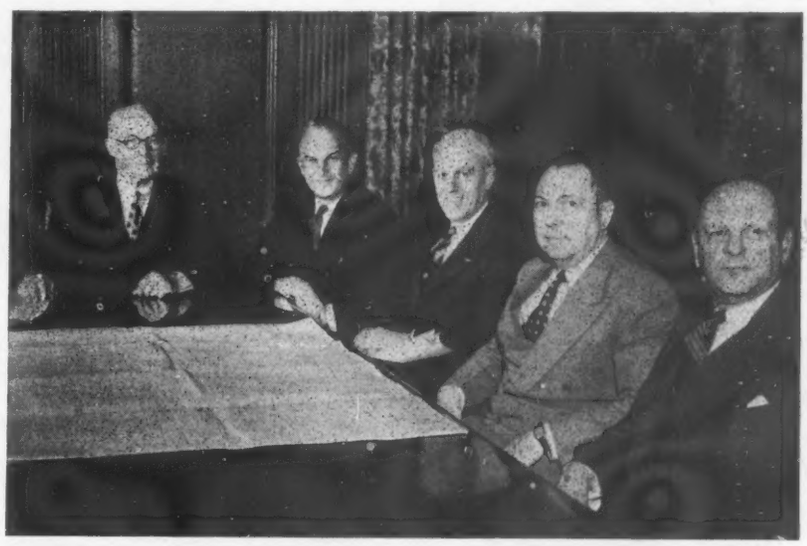
Beyond the assignment of priority rating, it is felt, must come a concurrent readjustment of military requirements for machine tools, for obviously the mere preference rating of 5000 machines is no guarantee they can be built, as long as tool builders' backlogs of rated military orders remains undisturbed. What seems to be required is a further screening of all machine orders, perhaps something like the double screening now being made on some lists—first at Detroit and then at Washington —so that military and essential civilian orders can be interlaced with respect to the actual time when they will be needed.

WPB also has given AA-3 priority rating covering expenditure of $35 million for construction of new plants and additions thereto, plus $40 million for the rehabilitation of tools, equipment and other facilities necessary to the resumption of passenger car production. Telegrams have been sent to the various companies confirming approval of their construction applications in the above category.

Last week a meeting was held here with top automotive officials and John S. Chafee of the WPB Tools Division, Bertrand Fox, of the Materials Division, and Henry P. Nelson, the WPB automotive reconversion co-ordinator, for the purpose of preliminary discussions of procurement of metals and other materials required for initial production, as well as for further clarification of the machine tool problem.

In respect to automotive steel requirements, some mill suppliers have left the impression at least that all detailed lists of requirements have been tossed aside, since they carried no rating and could not be included under CMP allotments. It is inferred these orders—there have not been too many—have not even been entered on books in order of receipt, and hence the entire procedure of specifying and ordering may have to be repeated when the WPB goes through with its "open-ending" of CMP and eventually with its replacment by a simplified priority system. If this is true generally, there may be some important shifting of automotive steel business from one mill to another. In contrast, machine tool suppliers, when approached last fall with automotive orders, at least entered them on their books and made acknowledgment of their receipt, promising shipment when government authorization permitted, and pricing as of date of shipment.

Basically, the steel problem simmers down to a matter of a straightforward reduction in military tonnage requirements before it will be possible to schedule automotive tonnage. Little can be accomplished by changing CMP procedure or assigning special ratings to this tonnage. If mill capacity is being absorbed by military requirements, real or fancied,



MOVE UP AT PACKARD: Engineering executive appointments in line with postwar expansions planned by Packard Motor Car Co., Detroit, at their first group meeting. Left to right: Col. J. G. Vincent, Packard vice president of engineering; W. H. Graves, former chief metallurgist and quality control manager with the company since 1919, now executive engineer; Arthur Nutt, former Wright Aeronautical engineering chief and now director of Packard aircraft engineering; C. R. Paton, chief engineer since 1932, and now director of automotive engineering; and Marsden Ware, since 1939 chief engineer of the company's Marine Engine Division, now director of marine and industrial engineering. Not shown is F. R. McFarland, engineering designer since 1924, who will head the Engineering Research Division

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everything else will have to wait. Mr. Krug has estimated 1,500,000 tons of steel available for civilian industry in the first quarter after V-E Day, but admittedly he is only guessing on this figure which could be much more and which could be available before German surrender if the latter event is going to be protracted for months while small pockets of resistance are ferreted out and squelched.

On the basis of passenger car production at an annual rate of 2,000,000 cars, automotive steel requirements for the first three months can be estimated around 1,000,000 tons of sheets, strip and bars.

The WPB's automotive reconversion staff is showing heartening speed in dealing with the problems as best it can. An important activity now under way is the study of the supply of necessary components for car production — frames, wheels, seats, hardware and a long list of other items which some producers normally buy on the outside. Many of these suppliers' plants are now virtually tied up tight on war production, and if they are to reassume their former automotive production, adjustments in war contracts will be essential. More than ever it is becoming apparent the initial phases of passenger car assembly will be highly makeshift, with all sorts of expediencies necessary just to get production rolling.

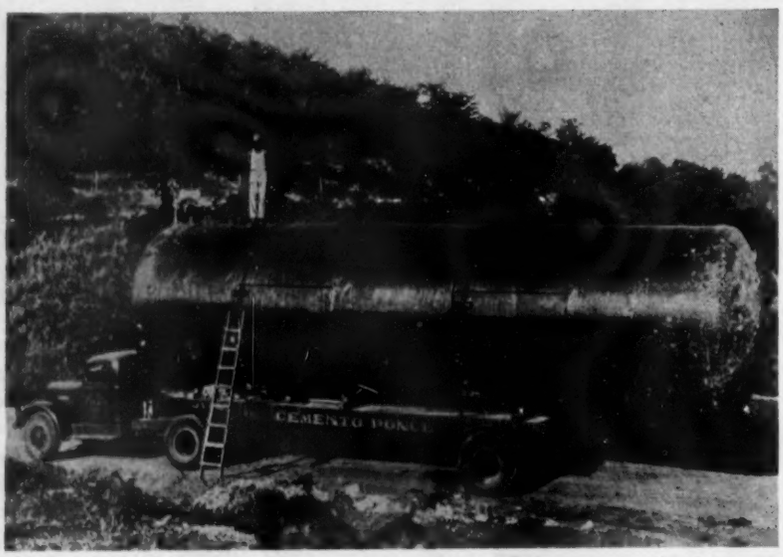
Packard stockholders heard the encouraging news from President George T. Christopher last week that the plant's productivity had increased 11 per cent since disclosure of inefficiencies during the Mead Committee hearings three weeks ago. At that time it was estimated productivity was off an average of 25 per cent, so the recent improvement goes a considerable distance toward the normal level. The Packard president also confirmed earlier predictions looking to a 20 per cent increase in new passenger car prices when they become available. Approximately 1200 Packard foremen voted last Tuesday on the question of whether they desired to be represented by the Foremen's Association of America, after having received three separate letters from the president of the company urging them against endorsing unionization of management employes.

The election was watched closely as an indicator of what may eventuate in other automotive plants. Should companies be required to recognize a foremen's union and negotiate contracts, a complete reshuffling of organizational charts in management will develop. Perhaps this is even now overdue, and the inroads of the FAA may be just the spark to touch off what would have come anyway. At first glance it would appear the intention of managements, if driven to the move, to transfer management authority from foremen to superintendents and their assistants, increasing their number of course, and relegating foremen to the positions of group leaders. This might be the initial step toward oblivion of foremen in the large automotive plants. Of course, it would mean the end of foremen in name only, for their normal functions would be assumed by management representatives at the superintendent level.

Examination of nearly 2000 of the 500-horsepower tank engines which ordnance has returned to the Ford Lincoln plant for reconditioning reveals marked resistance to wear under severe operating conditions. Some of the engines have run as long as 500 hours, at full throttle most of the time. Despite this, valve stems average only 0.0003-inch wear, and valve guides only 0.0005-inch. Wear of push-rod surfaces, usually excessive, was found negligible, despite the fact pressure of 180 pounds is exerted on the surface every time it is struck by a cam—1300 times a minute at full load.

Better than 20,000 of these engines, for installation in the M-4 type of tank, have been built at the Lincoln plant, and a considerable volume of machinery is now on order for extending the manufacture of a larger engine of the same type for use in the T-26, with Fisher building at least ten a day, according to government spokesman.

The Ford tank engine camshaft assembly is a refinement of racing car and aviation engine designs. Moving parts have been reduced from 80 to 30. Valve clearances are set permanently at the factory. Improved lubrication has been achieved by drilling larger oil holes and increasing their number. Drive is through a crankshaft-driven worm gear operating two hourglass worms. These in turn operate vertical driveshafts with hourglass worms at their opposite ends actuating two gears attached to exhaust and intake valve camshafts. Steel gears are used on the driving ends of the vertical shafts, where maximum thrust is required, with bronze gears on the camshafts.



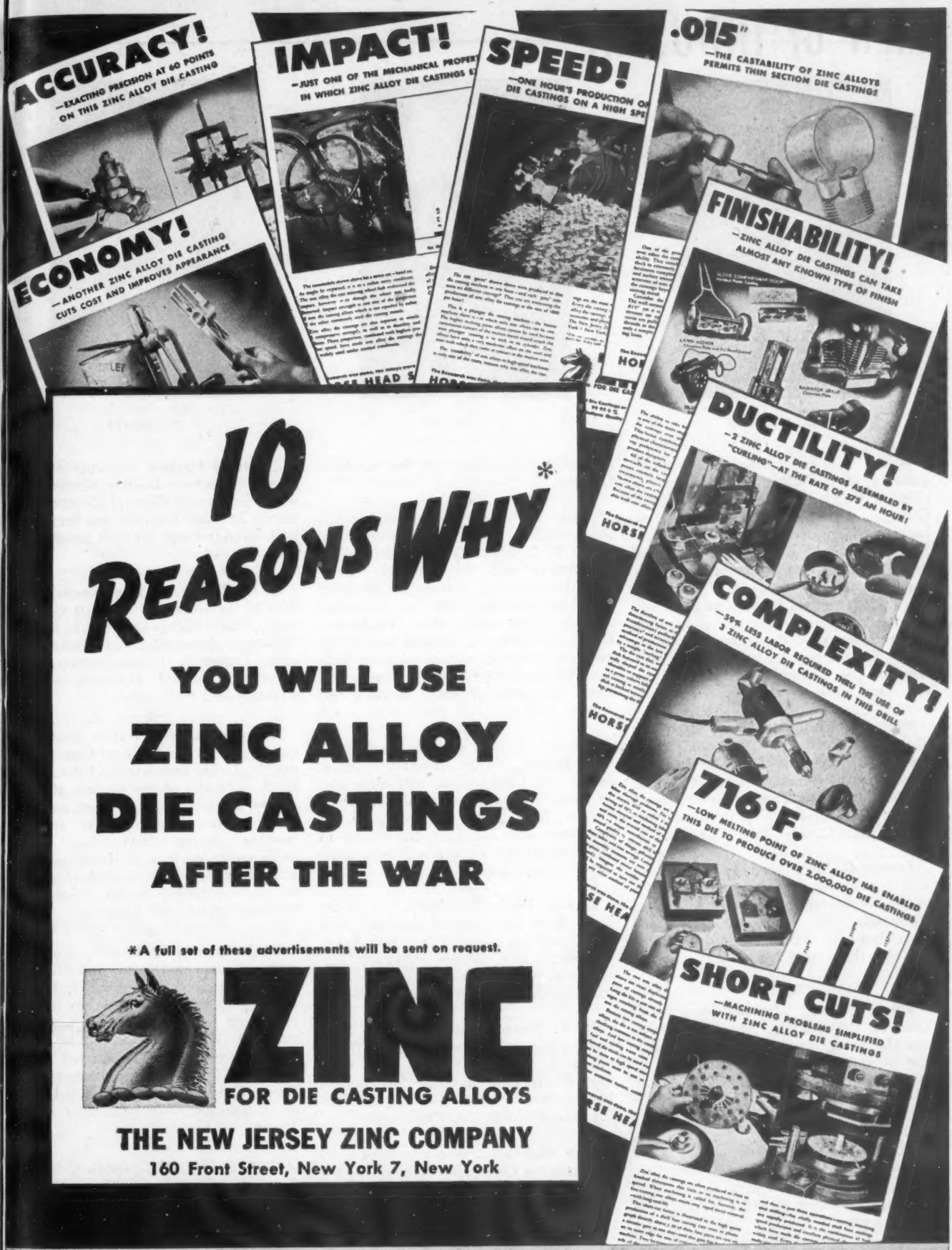
TRUCKING GIANT TANKS: Twenty-five steel petroleum tanks recently were hauled from one side of Puerto Rico to the other on White trucks. The tanks, which are 40 feet long and 12 feet in diameter, are employed in the storage of high octane gasoline

Book Deals With Mass Production

Christy Borth, author of *Pioneers of Plenty* and *True Steel*, the latter a chronicling of the life and times of George M. Verity of American Rolling Mill Co., has written a new volume called *Masters of Mass Production*, just published by Bobbs-Merrill Co. In it, the author, now a consultant with the Automotive Council for War Production, takes his readers behind the production scenes in the wartime automotive industry and reviews many of the hitherto unsung accomplishments of some of its great and near-great leaders.

He explains how mass production is characteristically an American art and traces its beginnings back to the days of the frontiersmen. Then he reviews in intimate detail the careers of such men as Lieut. Gen. W. S. Knudsen, the late Albert Kahn, Carl Johansson, H. R. Krueger, Delmar Roos, C. E. Sorenson and others.

To anyone even remotely familiar with the details of these achievements, the book is a "must," and will be read avidly by all concerned with the "business of making things." As are so many writers, Mr. Borth is an incurable romanticist, and the practical-minded may find his composition overindulgent on this score, yet, for a readable commentary and documentation of industrial America, particularly automotive, the book will rate high.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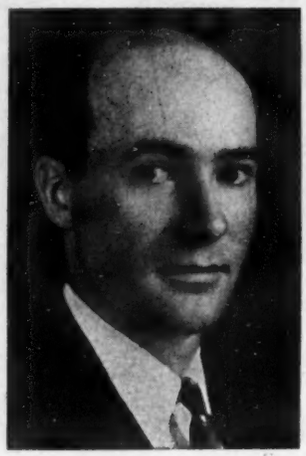


H. C. ATKINS

E. H. WELKER

W. O. Springer has been appointed manager of the Cleveland steel-service plant of Joseph T. Ryerson & Son Inc., Chicago. For the past 15 years he has been in charge of the Cleveland Special Steels Division. He is a graduate of Purdue University. After extensive experience with Babcock & Wilcox Co., Mr. Springer joined Ryerson in 1929 and became associated with the alloy, tool and stainless steel departments in Chicago. Some time later he was appointed head of the Special Steels Division at Cleveland.

—o—

Walter J. Curley has been elected a director of Pittsburgh Steel Co., Pittsburgh, to succeed the late Theodore W. Friend. Mr. Curley is vice president, General American Transportation Corp., Chicago, and president of its subsidiary, Pennsylvania-Conley Tank Car Co.

—o—

George G. Main has been elected assistant treasurer and assistant secretary of the Westinghouse Electric & Mfg. Co., Pittsburgh. Mr. Main, who has been associated with Westinghouse since 1926, will be the company's credit manager also.

—o—

Peter L. Lenz, who has been manager of the Middle Atlantic District manufacturing and repair department for Westinghouse Electric & Mfg. Co., Pittsburgh, has been named manager of the Pacific Coast District manufacturing and repair department.

—o—

E. W. McDonald, manager of sales engineering for the Griffin Wheel Co., Chicago, was honored at a dinner May 16 commemorating 50 years' service with the company.

—o—

Stanley Hawley has been named works manager of the Automotive Division of Willys-Overland Motors Inc., Toledo, O. Mr. Hawley rejoined the company in 1940 as superintendent of the Shell Division, after having been associated with Willys from 1919 to 1933. Prior to his new appointment, he held the position of general superintendent of the Machine Division.

—o—

Henry C. Atkins has been elected vice president in charge of manufacturing of E. C. Atkins & Co., Indianapolis. Mr. Atkins, with the company for 23 years, has served in Washington for three years as consultant for the Technical Awards Committee, War Production Drive, and advisor to Indiana State WPB panel for training within industry. **William Ed McCartney,** who has been promoted to superintendent, will assist Mr. Atkins.

—o—

James L. Kelley, division manager at Consolidated Vultee Aircraft Corp.'s San Diego, Calif., plant, will serve also as division manager of the company's Tucson, Ariz., plant, succeeding **W. R. Lawrence** who has been transferred to the corporation's Nashville, Tenn., plant as division manager.

—o—

Richard Erwin Dougherty, vice president, New York Central railroad, New York, has been awarded the 1945 Egleston Medal of Columbia University Engineering School's Alumni Association for "distinguished engineering achievement."

—o—

D. P. Morgan has joined the sales staff, Pittsburgh Steel Foundry Corp., Glassport, Pa., as assistant sales manager, Philadelphia district. Mr. Morgan had previously been sales engineer for the Hanna Stoker Co., Cincinnati.

—o—

Matt Koener has been appointed chief inspector for Caterpillar Tractor Co., Peoria, Ill., succeeding **M. D. Johnson,** resigned.

—o—

A. D. Camp has been assigned to the Foreign Sales Division of the Dorr Co. Inc., New York.

—o—

Charles L. Beard has been named vice president and treasurer, Bell Aircraft Corp., Buffalo, and also has been elected a director. **Leston P. Faneuf** was named secretary and chief of the corporate staff and **Harvey Gaylord** was appointed assistant treasurer. **D. Roy Shoults,** formerly engineer of General Electric Company's Aviation Division, has joined the Bell Aircraft Corp., as vice president of sales.

—o—

E. H. Welker has been elected president of the Ultra-Lap Machine Co., Detroit. Other officers named are: **Norman Walker,** vice president and general manager; **Ernest P. LaJoie,** secretary and treasurer; **Howard Hartness,** assistant secretary and treasurer.

—o—

Kenneth Campbell, senior project engineer, Wright Aeronautical Corp., Paterson, N. J., has been awarded the Wright Brothers Medal of the Society of Automotive Engineers for the best paper on aero-dynamics presented at an SAE meeting during 1944. Mr. Campbell's paper dealt with development of a cooling fan for air-cooled airplane motors, permitting better performance by cargo planes and bombers.

—o—

M. A. Hannan has been appointed director of plant protection, Republic Steel Corp., Cleveland, to succeed **J. L. Williams,** who has resigned to go into the consulting business. For the past three years, Mr. Hannan has been plant protection director for Consolidated Vultee Aircraft Corp., with headquarters in San Diego, Calif. Prior to that he had charge of Republic's plant protection in the Warren, O., district.

—o—

Herbert P. Ladds, president, National Screw & Mfg. Co., Cleveland, has been named president of the Cleveland Chamber of Commerce.

—o—

C. Forrest Tefft, president, Claycraft Co., Columbus, O., has been installed as president of the American Ceramic Society Inc., Columbus. **J. Edward Hansen,** director of service, Ferro Enamel Corp., Cleveland, has been elected vice president of the society, and **John D. Sullivan,** assistant to the director, Bat-

telle Memorial Institute, Columbus, has been re-elected treasurer. **Ross C. Purdy** is general secretary and editor for the society.

—o—

Clayton F. Fisher has been elected president and general manager of Sleeper & Hartley Inc., Worcester, Mass. He succeeds **William H. Blount** who retired because of ill health. **Raymond F. Russell** has been elected vice president and treasurer of the company.

—o—

F. S. Eldred Jr. has become general manager of the Explosives Division, Olin Industries Inc., East Alton, Ill., and its subsidiaries, including Western Powder Mfg. Co., Peoria, Ill., and Liberty Powder Co., Pittsburgh. He will assume duties also as general manager of the Equitable Powder Mfg. Co., East Alton, Ill., and its affiliates, Columbia Powder Co., Tacoma, Wash., Egyptian Powder Co., Pollard, Ill., and Texas Powder Co., Dallas, Tex. Other appointments in the explosive division include **R. R. Casteel**, secretary; **John Caruthers**, assistant secretary; and **E. J. Krupp**, assistant treasurer.

—o—

Frederick H. Norton has been named assistant vice president in the sales department, American Car & Foundry Co., New York.

—o—

R. H. Elliott has been appointed district apparatus and supplies manager of Westinghouse Electric Supply Co. His headquarters will be in Philadelphia. He has been engaged in a similar position with the company at Pittsburgh.

—o—

C. D. Dyer Jr., president, Dyer Engineers Inc., Cleveland, has been elected a director of Electro Refractories & Alloys Corp., Buffalo. Other new directors are **Joseph N. Moorhead**, works manager of American Magnesium Corp., Buffalo, and **Oliver A. Weppner**, vice president, Marine Trust Co., Buffalo.

H. F. MILLMANN

Who has been elected president, Geuder, Paeschke & Frey Co., Milwaukee as noted in STEEL, April 9, p. 95.

C. E. WYNN

W. I. FLOYD

—o—

Clarence E. Wynn has become manager of industrial relations, National Tube Co.'s Alloy Division plant at Gary, Ind., succeeding **Gray D. Hobby**, recently transferred to take a corresponding position in the company's Lorain works.

—o—

Henry S. Freynik has been promoted to the position of chief metallurgist, Riverside Metal Co., Riverside, N. J. He has been associated with the company's laboratories for 21 years.

—o—

George W. Dolan, president of Mathieson Alkali Works Inc., New York, has been elected to a one-year term as director-at-large on the board of the National Association of Manufacturers, New York.

—o—

Frank Klein, director of budgets for Worthington Pump & Machinery Corp., Harrison, N. J., has been elected a vice president.

—o—

William H. McConnell has been appointed assistant director of sales with Diamond Alkali Co. and will be located in the firm's general offices, Pittsburgh. He has been vice president of the Benner Chemical Co., Chicago.

—o—

J. L. Maddocks of the Reconstruction Finance Co. has become associated with the Barium Steel Corp., Canton, O., as manager of an office which the company has opened at 710 Fourteenth street, N. W., Washington.

—o—

Clarence G. Ozar, who has had 12 years' experience in metalworking industries, has been appointed to the staff of the metal cleaner service laboratory of the Cowles Detergent Co., Cleveland.

—o—

J. A. Holladay has been elected a vice president of United States Vanadium Corp., New York, and has taken charge of a newly formed Metal Chemicals Division. His headquarters will be in New York. **A. J. Gailey** will direct production and sales of the new division and will have headquarters at Niagara Falls, N. Y.

—o—

Walter I. Floyd, formerly executive vice president, Duff-Norton Mfg. Co., Pittsburgh, has been elected president, succeeding **Robert G. Allen** who has resigned. **E. M. Webb** has been elected vice president and general manager.

—o—

B. S. Pease, assistant manager of the Wire Rope and Construction Materials Division, American Steel & Wire Co., Cleveland, has retired. He is succeeded by **Myron E. Capouch** who has been assistant manager of the company's electrical and wire rope department at Chicago.

—o—

Russell H. Dragsdorf has been appointed operating manager of the Dodge Truck Division, Chrysler Corp. He has been associated with Dodge 27 years, the last five as plant manager of the truck plant.

—o—

J. E. N. Hume, commercial vice president and manager of the industrial divisions of General Electric Co., Schenectady, N. Y., and J. W. Belanger, manager of the Federal and Marine Divisions of that company, have been named assistant managers of sales of the Apparatus Department. **Karl H. Runkle** has been appointed manager of the Industrial Divisions and **R. S. Neblett** has been named Federal and Marine Divisions manager. **W. V. O'Brien** is the new manager of the company's Central Station Divisions, succeeding **H. V. Erben**, recently appointed assistant general manager of the apparatus department.

—o—

Roy B. Buckley has been appointed executive vice president, Timm Aircraft Corp., Los Angeles. He also has been reappointed general manager. **Don P. Purdy** has been named vice president and

MEN of INDUSTRY

R. B. SMITH

Who has been elected vice persident in charge of Sales, Elliott Co., Jeanette, Pa., announced in STEEL April 16, p. 96.

J. L. YOUNG

Who has been appointed vice president in charge of engineering, National Tube Co., Pittsburgh, noted in STEEL, April 16, p. 83.

treasurer, and **Hyman Smith** has been appointed secretary of the company.

—o—

Benjamin F. Courtright, superintendent, metallurgical and inspection department, Wisconsin Steel Division, International Harvester Co., Chicago, has been appointed sales manager to succeed **O. F. Seidenbecker** who has resigned. **Russell H. Hart,** sales department, has become assistant sales manager. Promotions at the works in South Chicago include: **Frederick M. Washburn,** from assistant superintendent, metallurgical and inspection department, to superintendent of the department; **John R. Pigott,** second assistant superintendent of the same department to assistant superintendent, **Roy A. Lindgren,** from superintendent of blast furnaces to second assistant general superintendent; **Paul R. Nichols,** assistant superintendent of blast furnaces to superintendent of the department; and **Roy P. Wheatley,** to assistant superintendent of blast furnaces.

—o—

E. Peerce Lake has been appointed general sales manager of Graham-Paige Motors Corp., Detroit. Mr. Lake had been vice president and general manager, Warren City Mfg. Co., Graham-Paige subsidiary at Warren, O.

—o—

Thomas Redmond has been appointed Detroit sales representative for the F. J. Stokes Machine Co., Philadelphia, with headquarters at 920 Balfour road, Grosse Pointe Park, Mich.

—o—

Harold D. Weber, general manager of the Oakland, Calif., Chamber of Commerce, has been chosen general chairman of the Pacific Coast Transportation Advisory Board.

—o—

Stephen A. Laurich, chemical engineer formerly associated with Ferro Enamel Supply Co., Cleveland, has joined the staff of Battelle Memorial Institute, Columbus, O., to engage in research in nonferrous metals.

OBITUARIES . . .

William R. Stuebing, 61, president, Stuebing Automatic Machine Co. and vice president, Lift Trucks Inc., both of Cincinnati, died in that city recently.

—o—

Charles L. Miller, 83, retired vice president, American Steel & Wire Co., Cleveland, and former superintendent of the Missouri Furnace Co., St. Louis, died April 10 at Pittsburgh.

—o—

Alexander B. Peterson Jr., assistant sales manager of the William D. Gibson Co., Division of Associated Spring Corp., Chicago, died April 16 in that city.

—o—

William C. Ritter, 61, production superintendent, H. & H. Tube Mfg. Co., Detroit, died recently.

—o—

George J. Genebach, 70, president, United Steel & Wire Co., Battle Creek, Mich., died recently at Luther, Mich.

—o—

P. A. Hewlett, export sales director of Consolidated-Vultee Aircraft Corp., San Diego, Calif., died recently at Washington. He was 53. Mr. Hewlett joined the Curtiss Aeroplane Co., in Buffalo in 1915 and in 1928 became vice president of Curtiss Airplane Export Corp.

—o—

Elmer M. Naylor, 49, founder and president, Rolyan Metal Products, Chicago, died April 5 in Wickenberg, Ariz. Prior to founding the company three years ago, he was vice president and treasurer of the Naylor Pipe Co., Chicago.

—o—

Alonzo C. Bell, 68, electrical engineer and prominent industrialist of Garwood, N. J., died recently at his winter home in Miami, Fla., from a heart attack. He had been president of the Bell Electric Motor Co., Garwood, and president of Powers & Robbins, which operated a foundry and machine shop there.

—o—

Walter N. Smith, 66, chairman of the board of the Illinois Tool Co., Chicago, died in that city recently.

—o—

H. E. Woolery, 70, president and founder of Woolery Machine Co., Minneapolis, died in that city April 10.

—o—

A. E. Cowden, 68, founder, Truth Tool Co., Mankato, Minn., died in that city recently.

—o—

Earl D. Studley, 58, an engineer in the Steam Turbine Department at Allis-Chalmers Mfg. Co., Milwaukee, for 25 years, died in that city April 9.

—o—

C. Norris Fleming, purchasing agent for New Jersey Zinc Co., New York, died April 15 in that city.

Abraham Lipkowitz, 68, president, Atlas Metal Co., Cleveland, died April 15 from a heart attack at his home, Cleveland Heights, O.

—o—

Harry L. Delander, long-time member of the advertising department of Crane Co., Chicago, died April 13.

—o—

Harry L. Vaughan, 74, president and treasurer, Vaughan Novelty Mfg. Co. Inc., Chicago, died in that city April 11.

—o—

William N. Weaver, 67, who retired in 1938 as superintendent of the steel plant, Northwestern Barb Wire Co., Sterling, Ill., now Northwestern Steel & Wire Co., died April 6 in Chicago.

—o—

Frank L. Williams, 79, president, Hamilton Emery & Corundum Co., Chester, Mass., died recently at his home in Ridgewood, N. J. He organized the company in 1903 and became president in 1915.

—o—

Herman L. Hirt, 41, assistant to the president, International General Electric Co., New York, died recently in a New Rochelle, N. Y., hospital following a heart attack.

—o—

Dr. Mortimer J. Brown, 62, retired, and formerly works manager of Niagara Electro Chemical Co., Niagara Falls, N. Y., died recently in that city.

Five-Point Program Adopted To Promote Western Steel Industry

Postwar objectives for maintaining employment, utilizing resources, developing markets and disposing of government-owned plants outlined by Iron and Steel Section of San Francisco Chamber of Commerce

SAN FRANCISCO

RETENTION and private development of iron and steel production in the West, primarily the Kaiser mill at Fontana and the Geneva Works in Utah, have been established as objectives of the Iron and Steel Section, San Francisco Chamber of Commerce. The committee set forth its findings and goals in a five-point program announced recently.

In discussing future prospects for the iron and steel industry in the West, the chamber section gave as its opinion that San Francisco and other western manufacturing centers should exploit opportunities for increasing fabrication of steel products.

"Manufacturing employment," the committee said, "in California has gained 134 per cent over 1940 and 176 per cent in the San Francisco Bay area.

"Production of iron and steel and their by-products has scored a 66.2 per cent gain in jobs in California and 25.4 per cent in the Bay area.

"A study of resources shows that coal and deposits of iron and other ores are abundant in the West, and there is a possibility that iron and steel can be produced from California ores by the use of electricity and natural gas which are amply abundant in this state."

The handicapping effect on western steel manufacturers of high freight rates and high eastern steel prices led to a recommendation that such rates and prices be studied with a view to bringing about a reduction in their levels.

Stating that postwar economic conditions will be defined primarily by the degree to which full employment is accomplished; that employment in many fields will be contingent on how many factory jobs are provided; and that factory jobs, in turn, will be subject to the production and availability of steel and iron, the committee outlined the following as its objectives:

1. Employment: To co-operate and engage in activities which will expand current and postwar factory employment throughout California and other western states over 1940 as much as economically justifiable and to seek and exploit opportunities for increased employment in the San Francisco Bay area in the production of steel and the fabrication of steel products, it being recognized (a) that factory jobs are basic to overall employment and (b) that steel production and availability are at the root of many other diversified industrial activities.

2. Resources: To increase the use of the West's existing facilities and natural resources so that production in those industries which are dependent on iron and steel may be more commensurate with the consuming capacity of the western states and large enough to supply world markets without undue limitations or cross-hauling of domestic supplies.

3. Markets: To suggest and, as far as possible, undertake studies of the western states market which will encourage production, fabrication and manufacturing of steel goods in the San Francisco Bay area in volume more consistent with the size and quality of the market which may be served most advantageously from here, determining specific deficiencies in western factory production and seeking provision of the particular types of steel and plant facilities necessary to overcome these deficiencies.

4. Prices and freight rates: To encourage careful studies and the subsequent dissemination of factual data concerning steel prices and freight rates applicable in the West with a view to accomplishing any economically justifiable adjustments.

5. Disposal of government plants: To influence the adoption of national policies and procedures which will expedite arrangements whereby a government-owned war plant, such as that at Geneva, may be disposed of for operation as a private enterprise on an economically sound basis and under terms and conditions that will be fair and equitable.

Los Angeles Industrial Expansion Shown by Survey

Results of a survey of 25 basic industries in Los Angeles in terms of machine tool expansions and horsepower capacities show a 78 per cent increase in productive capacity since 1939.

According to C. H. Dye, head of the Department of Water and Power which made the survey, there were 2529 plants operating here on an available 179,799 horsepower in 1939. Currently, there are listed 3960 plants with a total capacity of 317,348 horsepower. Plants using 25 horsepower or less were not listed.

SEA CAVALRY: These rows of invasion craft await the signal for movement into the Pacific battle at the Albany race track near San Francisco, a landing force depot set up last year. NEA photo

WING TIPS

Most of immediate postwar air travel will be in planes of approximate size of those now in use. Fleets of super-super-transports ruled out by cost factors. Personal flying will increase, but will still be limited

By G. M. WILLIAMS
Senior Vice President, Curtiss-Wright Corp.

THE HISTORY of aircraft manufacturing is one of high peaks and deep valleys. From small beginnings, the industry expanded quickly in 1917 to meet the needs of war. That was the first peak. Appreciable quantity production was under way by 1919. Then came the valley, a deep one, and the industry floundered in it for many years. A slight hump pushed the curve up again about 1927, but only briefly. Then in 1939 and 1940, World War II called for terrific expansion once more.

It is natural in the light of these tremendous variations in demand for aircraft that aeronautical development has been spasmodic rather than consistent.

Many a gallant pioneer of aviation has given his life to the advancement of aeronautical sciences. For, unfortunately, materials, power plants and known principles of flight could not measure up to the imaginations of the handful of pioneer designers. Many of their ideas are only now being adequately developed and fully utilized.

World War I caught the United States short, unable to design and produce, quickly enough, combat aircraft which would measure up to those of our more experienced enemy and allies. But we cannot write off this period in the aircraft industry's history so lightly. Expansion was called for, and starting with the few little job shops which then constituted the industry, expansion was accomplished. It was no easy task. The Curtiss Aeroplane & Motor Co. turned out 5000 of the famed "Jenny" training planes—tremendous production for those times, and the old Wright-Martin Co., another of the corporation's forerunners, was on a schedule of 2000 engines a month by 1919.

It was this period, too, which brought the industry many of the men who are its leaders today, engineers like Donald Douglas and the late Phil Johnson, production specialists from the automotive field like Eddie Rickenbacker and our own Guy Vaughan. This was a peak period for aircraft development, but once we passed that peak the aircraft industry entered its blackest decade.

Thousands of aircraft and engines filled the hangars and warehouses or lined the flying fields in France—new, virtually unused airplanes. In France the U. S. Army took the instruments, engines, etc., out of a number of airplanes and burned the remainder because it was cheaper to do that than to ship them back home. Immediately, a shocked hue and cry rose from the American public. The surplus must be sold, not destroyed, they said. "This is tax money that's at stake." So they put the surplus up for sale. And for the next 15 years that surplus formed a stifling pall over the nation's aircraft industry.

The Army and Navy bought a few new aircraft each year, but there was little incentive to engineer something radically new in airframes or engines. All too often the new plane had to be powered by an obsolete Liberty engine left over from World War I. Despite sales of those old Libertys to rum runners, then sales of more of them to the Coast Guard so they could catch the rum runners, 3000 engines were still jamming Army warehouses as late as 1932.

G. M. WILLIAMS

This period of the early 1920s was the disarmament period, and the federal government was not investing its funds in research and development. The painfully slow progress of aviation during these years was accomplished to a great extent without the benefit of developmental contracts from the Army or Navy. The manufacturer gambled his small resources, plus what he could borrow, on a new idea. If it worked, he sometimes could count on a small order and temporary solvency. If it didn't —well, the mortality rate in aircraft companies was pretty high in those days.

First break in the clouds was the investigation and report in 1925 of what today is known as the Morrow board, which was appointed to look into charges made by the late Gen. Billy Mitchell regarding the nation's dangerous neglect of air power. Out of this committee's findings came new research and development contracts for the manufacturers; not many, to be sure, and not large, but contracts—financial backing and encouragement for the first time since the war.

The recovery after the depression of 1932 was slow. In all of 1935, for instance, Curtiss-Wright turned out but 56 airplanes. Several C-W plants repeatedly far exceeded that figure in one week's output during this war. And the entire industry produced only 3675 planes in the year 1938. Only 1800 of those planes were military aircraft. Contrast that with last year's output of more than 100,000 airplanes.

Much of the airpower we own today was not yet on the drawing board, let alone the assembly line, with the outbreak of a new world war. In fact, just as airmen of World War I fought most of their battles in foreign-built planes, we had to depend again this time on the aircraft of allies to hold the line until we could create American air power. British and French orders for aircraft and engines launched, and to some extent paid for, the expansion of the aircraft industry's production facilities in 1938 and 1939. This gained at least a year in expanding for war.

Floor Area Increased 25 Times

Curtiss-Wright employed 8600 early in 1938. At peak last year, the total employment figure was 186,000. Manufacturing floor space is 25 times the prewar area. In 1938, C-W shipments of aircraft, engines and propellers amounted to just over $33,000,000. In 1943 they were $1,295,000,000. And last year's total will be substantially higher.

This huge expansion program was not accomplished without difficulty or without mistakes. It meant training vast new plants full of people—older men, women and youngsters, to make a precision instrument. For the modern combat airplane is exactly that—an oversize precision instrument.

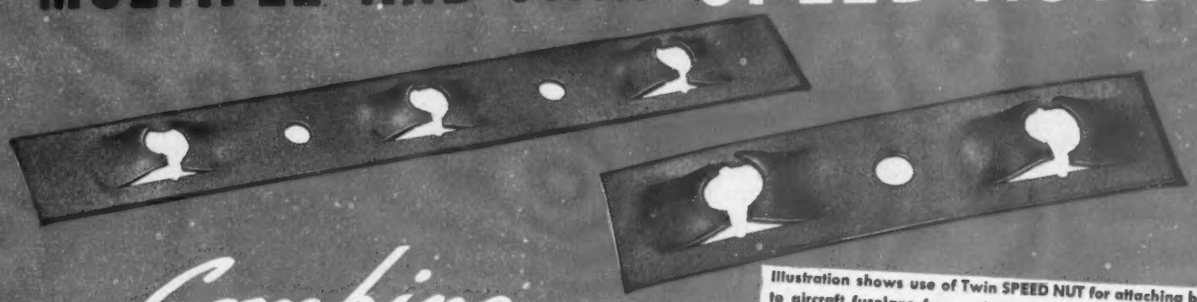
Production planning had to set up simple, easily taught assignments which green hands could manage. Thousands of new foremen and executives had to be trained. Critical material shortages had to be solved and millions of dollars of new equipment had to be built. This expansion program meant bringing in hundreds of subcontractors, providing them with blueprints, with the know-how of tooling up for this work, sometimes with key men to aid them.

One cannot properly review the past or forecast the future of the aircraft industry without giving due recognition to commercial air transport operations. Progress in military and commercial aviation of necessity o hand in hand. Wartime design development is in debt in many ways to the technological progress, high altitude and weather research accomplished by the nation's airlines during the past decade and a half.

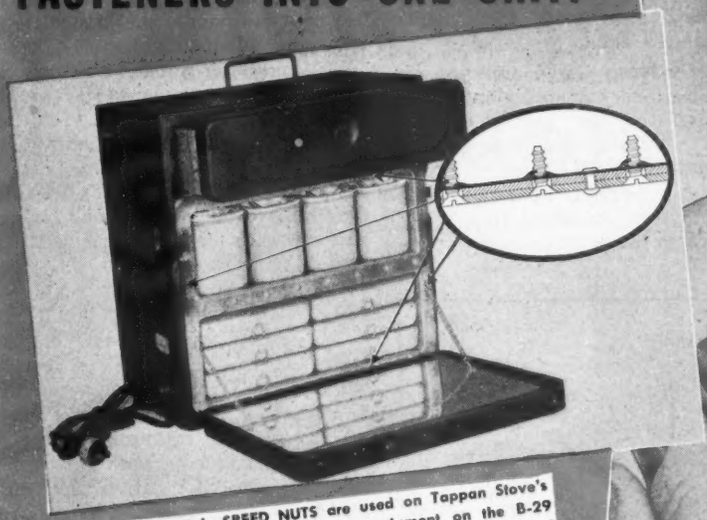
Yet, despite the important role of air transport, we cannot count on commer-

This article is abstracted from an address which Mr. Williams gave before the Chicago Forum on Aviation on April 10.

MULTIPLE AND TWIN SPEED NUTS



Combine FASTENERS INTO ONE UNIT!



Four Multiple SPEED NUTS are used on Tappan Stove's food warmers, now standard equipment on the B-29 Super Fortress. Only 10 rivets necessary to hold all 4 SPEED NUT strips for blind attachment of liner to cabinet.

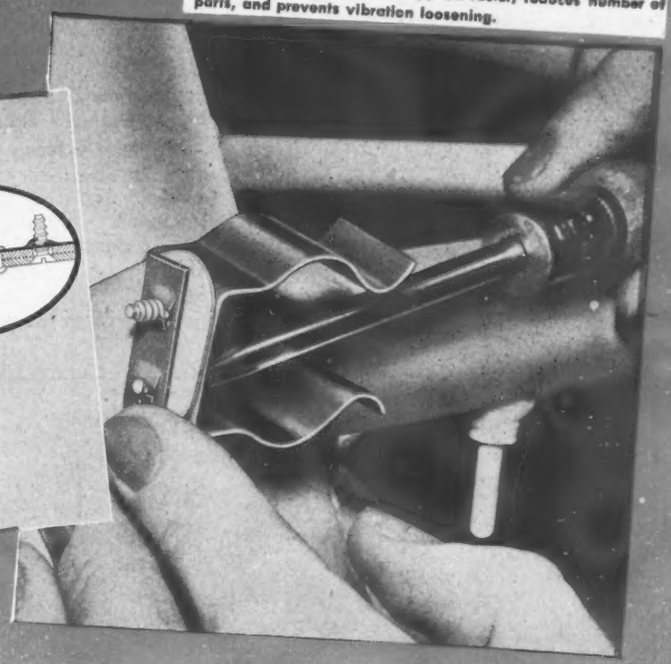


Illustration shows use of Twin SPEED NUT for attaching bracket to aircraft fuselage frame. Applied faster, reduces number of parts, and prevents vibration loosening.

Individual SPEED NUTS offer tremendous advantages over ordinary fasteners, but Twin and Multiple SPEED NUTS go even further. They COMBINE two or more SPEED NUTS into one unit to simplify, reinforce and speed up multiple fastening attachments.

Twin type SPEED NUTS are available with ½" to 1" hole spacings, for machine screws or sheet metal screws. Center hole in SPEED NUT permits riveting in place for blind location assembly.

Multiple type SPEED NUTS are available with 1" to 2" hole spacings, for 6Z, 8Z or 10Z sheet metal screws. Supplied in any desired lengths or in coils. Made of spring steel for riveting in blind location, or stainless steel for welding. In writing for samples, please give screw size and hole spacing.

THE BASIC PRINCIPLE
of Spring-Tension Lock is
Embodied in all Speed Nut Designs

TINNERMAN PRODUCTS, INC.
2039 FULTON ROAD, CLEVELAND 13, OHIO
In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London

Speed Nuts PATENTED *Trade Mark Reg. U. S. Pat. Off

FASTEST THING IN FASTENINGS

cial aviation to be able soon to absorb the output of more than a small segment of the country's present aircraft production capacity. Just prior to the war, airlines were operating about 340 transport planes. Naturally, their needs after the war, with expanded routes, better equipment, and increased travel, will be much greater. But with new transport types carrying double the load of present airliners it is unlikely domestic commercial aviation will require more than 1000 planes by 1950. That is a long way from the usual "blue sky" expectation of tens or hundreds of thousands of planes blackening the sky.

Without attempting to belittle the aircraft industry outlook, it is of extreme importance for business men to know just what to expect. Therefore, put it down in your little black book right now that by far the majority of postwar travel, at least for several years, will be in airplanes little larger than those in regular airline service today. There is no place in the foreseeable future for vast fleets of super-super-transports making frequent domestic stops with huge cargoes of upward of 200 passengers.

So far as we in the industry can predict, on the basis of talks with our friends in the airlines, there will be a demand for roughly four types of transport equipment: A small 10 to 15 passenger plane for the feeder lines; a passenger plane about the size of the present DC-3 airliner for trunk line operation; a third class for 36 to 60 passengers which will carry the bulk of airline business—this is the class in which the present four-engine Douglas C-54 and twin-engine Curtiss Commando will be available as soon as the war permits; a fourth class comprising a relatively small number of large transports capable of carrying 100 or more passengers in transoceanic or transcontinental flights. There will also be some purely cargo planes in regular operation shortly after the war, carrying high priority shipments of merchandise, first class mail, fresh fruits and vegetables, etc.

The tremendously large transport is ruled out of ordinary domestic operation, for the present at least, because of cost factors. It is far more economic to have a large number of 40-passenger planes on frequent schedules, operating near capacity, absorbing overload from other flights, than to have extra-large equipment flying far short of capacity on some schedules in order to maintain regular service.

Not in private flying either will the sky be blackened with "grasshopper" planes. There will be far more personal flying than before the war. We shall need many more airports, air parks, flight stops and air harbors for these private fliers. But let us not expect to see harassed traffic cops in helicopters desperately untangling an aerial traffic jam in the middle of the city as the commuters fly in to work. That is a long way off.

From the standpoint of manufacturing, few of the companies now engaged in warplane production will be a factor in postwar private plane output. Plants are too expensively equipped for this type of production. Present operators in this field can handle the immediate market quite adequately.

The helicopter is not the average man's airplane. It is a long way yet from fitting commuting needs. Problems of control, of high tip speeds on the rotors, small usable loads carried, and cost of maintenance will keep it in the luxury range for the immediate postwar years, if not still in the experimental stage.

Must Not Become Complacent

We dare not become complacent again, as we did after the first great world war. True, we have accomplished a veritable miracle by building the world's greatest air force in less than four years, under pressure of war necessity. But we dare not, because of one miracle, believe that we have acquired a momentum which will simply carry on by itself, or that we have discovered some secret formula by which air supremacy can be accomplished, at will, overnight. We cannot leave it to chance.

The United States has opportunity to make of aviation a great power for good. We have built the finest facilities in the world, trained 2,000,000 aircraft workers and 3,000,000 airmen. We have created an industry which can guarantee our security, enhance our trade and travel and enrich the lives of our people. All this will not come of itself; it must be accomplished with the constructive assistance of government and the intelligent and far-seeing support of an air-minded public. American engineering genius has proved its supremacy when properly supported. We must continue to support it to insure our future international safety.

TOWN BUSTER: British 11-ton bombs, already filled with explosive, go off the assembly line at a Ministry of Supply factory. The "town busters", are nearly twice the size of the block busters which caused so much havoc to German cities. NEA photo

Detroit Firm To Continue Making Aircraft Gearing

Manufacture of helicopter transmissions and other aircraft gearing will be continued after the war by the Detroit Gear & Machine Division of Borg-Warner Corp., Chicago, as a result of successful experience in producing these parts during the war.

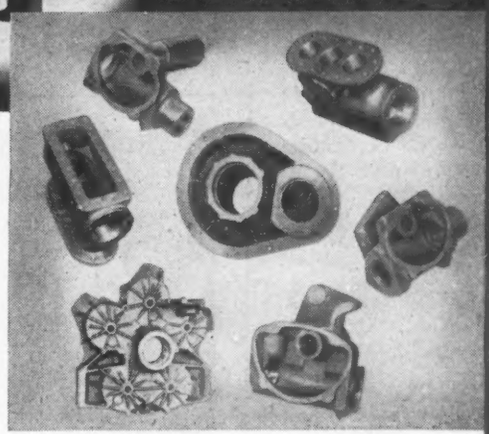
$64

XLO
EX-CELL-O for PRECISION

HERE'S THE ANSWER TO *Your* PRODUCTION PROBLEM

See EX-CELL-O *first*

Below: Ex-Cell-O designed and built Precision Way Machines turn out accurate metal parts on a high production basis (a few typical parts are illustrated). These single-purpose machines (in many cases made highly flexible by the new Ex-Cell-O type of bolted-section construction) often perform numerous operations in one setting, bringing not only a substantial increase in the number of parts produced but also improved quality and reduced unit cost.



Above: A typical application of an Ex-Cell-O Precision Boring Machine. This particular machine is a three-way type. The center section is designed to hold the part rigidly while the spindles are advanced, the holes being bored in exact relation to each other. The spindles have individual adjustments. The part shown here is a differential carrier steel casting, with two holes finish bored at each end and one from the rear, simultaneously. Each wing of the machine is individually set as to speed and feed with its own hydraulic feed panel. Once the most efficient speed and feed combination is reached, the whole machine is controlled by means of push-buttons, located for the operator's convenience. The machining cycle is automatic after the "start cycle" button is pressed.

NOW is the time to consult Ex-Cell-O about your future production requirements . . . about the use tomorrow of production machines that will give you definite advantages in speed, accuracy and finish, that will enable you to get unit cost down to a competitive basis. Your problem may be readily solved by machines designed and built for your specific needs. That is why, when designing your postwar product, you should plan at the same time for the best way in production. For more than a quarter century Ex-Cell-O has been foremost in the design and construction of special multi-purpose and semi-standard machines for America's leading industries, large and small. This valuable "know how" is at your disposal. Get in touch today with Ex-Cell-O at Detroit or with any of its field engineers in 32 other cities.

45-52

Standard and Special Multiple Way-Type Precision Boring Machines

Multiple Drilling and other Special Purpose Machines

Precision Thread Grinding Machines

Precision Lapping Machines

Broaches and Broach Sharpening Machines

Continental Cutting Tools

Tool Grinders

Hydraulic Power Units

Grinding Spindles

Drill Jig Bushings

Fuel Injection Equipment

R. R. Pins and Bushings

Pure-Pak Paper Milk Bottle Machines

Aircraft and Miscellaneous Production Parts

EX-CELL-O CORPORATION DETROIT 6 MICHIGAN

Steel Warehouse Chapters Elect New Officers

Groups at Baltimore, Chicago, Denver, Detroit, Salt Lake City, Los Angeles, Houston and Milwaukee make announcements

ANNUAL election of officers of a number of chapters of the American Steel Warehouse Association, Cleveland, was announced last week by Walter S. Doxsey, president of the organization.

Elections announced are as follows:

BALTIMORE CHAPTER—President, Arthur M. Pfeiffer, Dietrich Bros. Inc., Baltimore; vice president, Harold Dell, John J. Greer & Co. Inc., Baltimore; secretary-treasurer, J. D. Boan, United States Steel Supply Co., Baltimore; chapter director, George J. Parke, Eagleston-Parke Inc., Norfolk, Va.

CENTRAL STATES CHAPTER — President, L. B. Worthington, United States Steel Supply Co., Chicago; vice president, E. B. Fisher, National Steel Co., Chicago; vice president, A. E. Kuby, Standard Steel & Wire Corp., Chicago; secretary, T. B. Daniels, Jones & Laughlin Steel Corp., Chicago; treasurer, D. F. Grace, Chicago Steel Service Co., Chicago; chapter director, H. V. Douglas, Central Steel & Wire Co., Chicago.

COLORADO CHAPTER — President, H. V. Waterman, Hendrie & Bolthoff Mfg. & Supply Co., Denver; vice president, J. H. Singleton, C. A. Crosta Inc., Denver; secretary-treasurer, A. M. Hays, Hendrie & Bolthoff Mfg. & Supply Co., Denver; chapter director, H. V. Waterman, Hendrie & Bolthoff Mfg. & Supply Co., Denver.

DETROIT CHAPTER—President, T. L. Parker, Edgar T. Ward's Sons Co., Detroit; secretary-treasurer, L. M. Craig, Steel Plate & Shape Corp., Detroit; chapter director, G. W. Cooke, Jennison Hardware Co., Bay City, Mich.

INTERMOUNTAIN CHAPTER—President, H. P. Lambrecht, Salt Lake Hardware Co., Salt Lake City, Utah; vice president, L. S. Packman, Steel-Engineers Co., Salt Lake City; secretary-treasurer, H. C. Kimball, Z.C.M.I. Wholesale Hardware Division, Salt Lake City; chapter director, H. P. Lambrecht, Salt Lake Hardware Co., Salt Lake City.

SOUTHERN CALIFORNIA CHAPTER—President, E. Jungquist, Percival Steel & Supply Co., Los Angeles; vice president, William L. Rawn, The R-J-M Co., Los Angeles; vice president, Wayne Rising, the Ducommun Metals & Supply Co., Los Angeles; secretary-treasurer, W. H. Lindberg, E. M. Jorgenson Co., Los Angeles; chapter director, E. Jungquist, Percival Steel & Supply Co., Los Angeles.

TEXAS CHAPTER—President, R. L. Philips, Peden Iron & Steel Co., Houston, Tex.; first vice president, W. C. Jaschop, Briggs-Weaver Machinery Co., Dallas, Tex., second vice president, J. H. Maxwell, Maxwell Steel Co., Fort Worth, Tex.; secretary, N. A. Fitch, National Steel Products Co., Houston, Tex.; treasurer, V. P. Williams, Markle Steel Co., Houston, Tex.; chapter director, R. L. Philips, Peden Iron & Steel Co., Houston, Tex.

WISCONSIN CHAPTER—President, Carl Gallauer, United States Steel Supply Co., Milwaukee; vice president, George Heiden, Shadbolt & Boyd Co., Milwaukee; secretary-treasurer, Reimar A. Frank, A. M. Castle & Co., Milwaukee; chapter director, John Pritzlaff, John Pritzlaff Hardware Co., Milwaukee.

Mesta Machine Co. Awarded Fifth Star for War Work

Mesta Machine Co., Pittsburgh, is the first company in the Pittsburgh district to be honored with a fifth white star for its Army-Navy "E" flag, indicating the success of the company's efforts to produce vitally needed war materials.

The firm on Sept. 11, 1941 was one of the first to be given the Navy Bureau of Ordnance "E" award. It later received the all-Navy "E" burgee and subsequently the Army-Navy "E" to which has now been added the fifth star. Each of the five stars signifies recognition of continued outstanding war production.

In informing Lorenz Iversen, Mesta president, that Mesta had merited the fifth star award, Admiral C. C. Bloch, U. S. Navy (Ret.), chairman of the Navy Board for Production Awards, said: "The courageous men on the fighting fronts must have the necessary weapons with which to wage total war. These men appreciate the vital support of the men and women of the Mesta Machine Co. who have worked with such untiring effort on the production front to supply these needed war materials."

Steel Tool Manufacturing Plant Locates in Nevada

Construction in Las Vegas, Nev., of a plant to be known as Steel Conversion Corp. and which will manufacture custom industrial tools of special alloy steel has been announced by G. A. Duemling, formerly of Pittsburgh. The new concern is a subsidiary of Steel Conversion & Supply Co., Pittsburgh.

Need for a western manufacturing plant has been felt for years by the parent company.

New Research Institute Begins Full-Scale Work

The newly formed Midwest Research Institute at Kansas City, Mo., has begun full-scale work in newly equipped laboratories under the direction of Harold Vagtborg, nationally known scientist and former director of the Armour Research Foundation, Chicago.

PRESERVE WAR RECORD: Six days before the amphibian tank Beachbuster made its debut in the Okinawa invasion, this James Sessions painting of the hull assembly line at Ingersoll Steel & Disc Division, Borg-Warner Corp., Kalamazoo, Mich., became a part of the company's war production record. Above, the painting is being presented by Howard E. Blood, left, Borg-Warner vice president, to R. C. Ingersoll, head of the Ingersoll Division. At right is his son, R. S. Ingersoll, works manager at Kalamazoo and co-ordinator of the company's tank program

Steelworkers Getting Better Balanced Meals

"Health for Victory" diet plan, introduced in some 20 steel mills, effecting changes in workers' eating habits

THE HOT DOG and the hamburger reign as the choice of many steelmen for a snack during working hours, but the war is bringing changes in diet, with the beneficial effect of introducing greater variety and increasing use of vegetables, according to the American Iron and Steel Institute.

Under the "Health for Victory" diet plan, introduced into some 20 steel mills, wives are taught proper and economical methods of selection, purchase and cooking of foods. They hold group meetings, attend lectures, canning demonstrations, food budgeting forums and the like.

The result is better balanced meals at home and in lunch boxes, more "green stuff" in food the men buy themselves at mills where there are canteens.

On an eight-hour shift steelworkers may send for food as often as three or four times. When they get hungry while on the job they eat doughnuts or rolls and coffee. Then later on, they send for their lunch, finishing off with a bite in the early afternoon.

The influx of women into steel mills is said to have increased consumption of salads.

The practice of taking 10 or 12 sandwiches to work, popular a quarter century ago, has largely been supplanted by the idea of having one hot food in every meal.

Officers Re-elected by Phoenix Iron Co.

The officers of the Phoenix Iron Co. and Phoenix Bridge Co., Phoenixville, Pa., were re-elected and four new directors were chosen at the recent annual stockholders' meeting of these companies.

The new directors on a board of five, representing both Phoenix Iron and Phoenix Bridge, are David G. Baird, L. B. Hatch, W. C. Miller Jr., and G. F. Train. David Thomson, the remaining member, was re-elected.

The officers of Phoenix Iron are David Thomson, president; W. O. Lang, secretary; R. E. Craig, assistant secretary and treasurer; and E. W. Knox, assistant treasurer.

Officers of Phoenix Bridge are David Thomson, president; R. J. Carney, secretary; R. E. Craig, treasurer, and E. W. Knox, assistant treasurer.

HANDLING WITH CARE: Tungsten carbide artillery cores, made of the hardest metal yet produced by man, are handled with care in wooden "boats" lined with sponge rubber to protect them before hardening in the Natrium, W. Va., plant of Carboloy Co. Inc.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Laystrom Inc., Chicago, has acquired control of the Geo. B. Limbert & Co. The latter firm will continue in business with general offices and warehouse at 570 Fulton street, Chicago.

—o—

Rheem Research Products Inc., Baltimore, has formed a marketing division to promote and broaden the use of Iridite, a corrosion-resistant finish for zinc and cadmium plated surfaces, zinc die castings and hot-dip galvanized products.

—o—

Duramold division, Fairchild Engine & Airplane Corp., has moved its general offices and factory from New York to Girts road, Jamestown, N. Y.

—o—

A. Schrader's Son, Brooklyn, N. Y., has published an anniversary book, "100 Years of Air Control," reviewing advancement that has been made in pneumatic valves and allied air control products since the company was established in 1844 by August Schrader.

—o—

Cincinnati Time Recorder Co., Cincinnati, has sold its Food Machinery Division to Dayton Acme Co., Cincinnati, which is making it a division of an affiliate, Osborne Register Co., Cincinnati.

—o—

E. J. Perry Machinery Corp., has moved from New Bedford, Mass., to Jefferson and Lawton streets, Fall River, Mass.

—o—

The Edward Valve & Mfg. Co. Inc., East Chicago, Ind., has been awarded a fifth gold star by the U. S. Maritime Commission for continued production achievement in manufacture of essential cast and forged steel valves.

—o—

Republic Mining & Mfg. Co., New York, has changed its name to Alcoa Mining Co. to identify the firm more closely with Aluminum Co. of America, of which it is a 100 per cent subsidiary.

—o—

American Can Co., New York, has halted equipping of a new plant at Pine Bluff, Ark., where fiber containers for artillery shells were to have been made.

—o—

Standard Steel & Wire Co., Chicago, has been appointed by Brainard Steel Corp., Warren, O., as exclusive sales representative for electrically welded steel tubing.

—o—

U. S. Maritime Commission has discontinued its production award program. Fewer than 200 "M" pennants were awarded to shipyards and key manufacturing plants under the program.

HEAT TREATING Stainless Steels

Second and concluding article on data worked out by metallurgists of Rustless Iron & Steel Corp. covers straight chromium and chromium nickel nonhardenable grades. Procedures recommended for straight chromium hardenable grades were described in STEEL April 16

GROUP II, the straight chromium, nonhardenable grades (ferritic) of stainless steel, is made up of alloys also containing chromium as the chief alloying element (from 14.0 to 27.0 per cent) and with generally low carbon contents (from about 0.08 to 0.20 per cent). Nickel is present in these alloys only as traces. Principally because of their higher chromium contents, as well as lower carbon contents, these alloys do not harden to any appreciable extent when quenched from high temperatures. They are also magnetic. When annealed, their crystalline structure is composed primarily of the microconstituent alpha ferrite. Accordingly, they are referred to as "ferritic" stainless steels. The chemical analysis of this group is given in Table IX.

Heat Treating: The alloys in this group cannot be hardened to any appreciable extent by quenching from high temperatures. Types 430 and 430F harden to about 250 to 275 brinell when rapidly cooled from 1800 to 1850 degrees Fahr. Types 442 and 446 cannot be hardened even to a small degree by such a treatment. The alloys tend to develop a coarse grained structure if held for any prolonged period above 1650 degrees Fahr. and may become embrittled by such treatment. Accordingly, they are normally subjected only to annealing treatment consisting of heating to 1450 to 1550 degrees Fahr. for 1 to 2 hours followed by water quenching.

If a temperature of 1550 degrees Fahr. is not exceeded in heat treating Type 430, or 1450 degrees Fahr. in the case of 430F, they may be water quenched after annealing. Types 442 and 446 may be rapidly cooled from any temperature without harmful results. In general, cooling these alloys rapidly from annealing temperatures results in better impact properties. Annealing procedure is given in Table X.

In some special cases where Type 430 is subjected to severe cold forming operations as in cold heading, the following annealing cycle is employed. Heat to 1500 to 1650 degrees Fahr. for 2 to 3 hours, slow cool to 1000 to 1200 degrees Fahr. at a rate of 25 to 50 degrees Fahr. per hour, then air cool to room temperature. This special treatment is not generally recommended for most applications for, while it produces slightly lower hardness, it also reduces the notch toughness of this grade.

If the grain structure of the alloys is coarsened by overheating, this condition can be corrected to some extent by cold working the material before annealing. Moderate cold deformation is required, however, and very slight cold working should be avoided. Average results of this annealing are given in Table XI, and Fig. 16 illustrates typical structures obtained.

Group III, the chromium-nickel, nonhardenable grades (austenitic), is made up of alloys containing nickel (6.0 to 22.0 per cent) as well as chromium (16.0 to 26.0 per cent) as the chief alloying elements. Other elements such as molybdenum, titanium, and columbium may also be present to confer special corrosion properties. Except for surface

(*Please turn to Page* 128)

Fig. 16—*Structures of typical Group II annealed stainless steels* (*A*) *Type* 430, (*B*) *Type* 446. *Magnification* 500*X*

Fig. 17—*Effect of cold-work on the tensile strength of some typical stainless steels*

Fig. 18—*Structures of typical Group III nonhardenable chromium-nickel stainless steels* (*A*) *annealed Type* 304, *carbides dissolved*, (*B*) *"sensitized" Type* 302 *showing precipitated carbides*, (*C*) *annealed Type* 347 *and* (*D*) *cold-worked Type* 301. *Magnification A, B-200X; B, C-500X*

TABLE IX

GROUP II STRAIGHT CHROMIUM, NONHARDENABLE STAINLESS STEEL GRADES (FERRITIC) CHEMICAL ANALYSIS

AISI Type	C	Mn	Si	P	S	Cr
430	0.12 max.	1.00 max.	1.00 max.	0.04 max.	0.04 max.	14.0/18.0
430 F	0.12 max.	1.00 max.	1.00 max.	0.04 max.	0.07 min.*	14.0/18.0
442	0.35 max.	1.00 max.	1.00 max.	0.04 max.	0.04 max.	18.0/23.0
446	0.35 max.	1.00 max.	1.00 max.	0.04 max.	0.04 max.	23.0/27.0

*Analysis for Rustless Iron & Steel Corp. Grade 17 FM; Usual range 0.18/0.35.

TABLE X

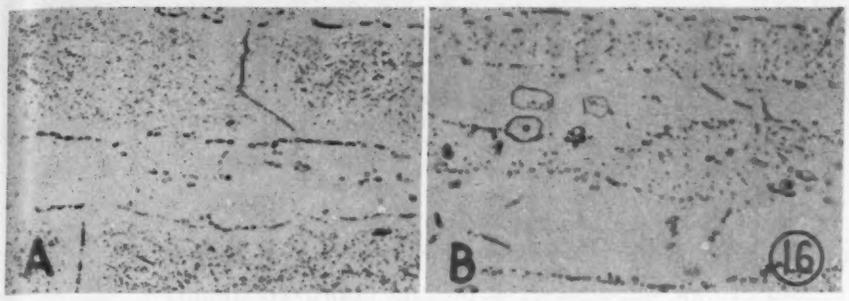
ANNEALING PROCEDURE FOR STRAIGHT CHROMIUM NONHARDENABLE STAINLESS STEEL GRADES

AISI Type	Annealing Temperature	Time in Hours	Cooling	Hardness Brinell	Hardness Rockwell
430	1450-1550°F.	1-2	Air or water	140-165	B 77-85
430 F	1250-1450°F.	1-2	Air or water	165-190	B 85-91
442	1450-1550°F.	1-2	Air or water	150-175	B 80-88
446	1450-1550°F.	1-2	Air or water	160-185	B 84-90

TABLE XI

AVERAGE RESULTS OF ANNEALING THE STRAIGHT CHROMIUM, NONHARDENABLE STAINLESS STEEL GRADES

Type	Hardness Range Brinell	Hardness Range Rockwell	Average Mechanical Properties Ult. Tens. Str. P.S.I.	0.2% Yld. Str. P.S.I.	% Elong. in 2"	Red. of Area %	Izod Impact Range Ft. Lbs.
430	140-165	B 77-85	70,000	40,000	35	70	15-35
430 F	165-190	B 85-91	85,000	50,000	27	57	15-35
442	150-175	B 80-88	75,000	45,000	31	60	5-15
446	160-185	B 84-90	80,000	50,000	27	60	1-10



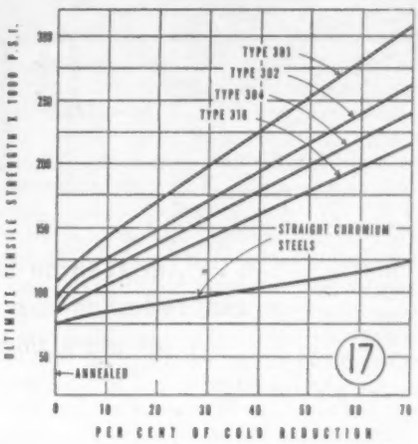


TABLE XII

GROUP III CHROMIUM-NICKEL, NONHARDENABLE STAINLESS STEEL GRADES (AUSTENITIC)

Chemical Analysis

AISI Type	C	Mn	Si	P	S	Cr	Mi	Other Elements
301	over 0.08/0.20	2.00 max.	1.00 max.	0.04 max.	0 04 max.	16.0/18.0	6.0/ 8.0	
302	over 0.08/0.20	2.00 max.	1.00 max.	0.04 max.	0.04 max.	17.0/19.0	8.0/10.0	
304	0.08 max.	2.00 max.	1.00 max.	0.04 max.	0.04 max.	18.0/20.0	8.0/10.0	
303	0.20 max.	2.00 max.	1.00 max.	*	*	17.0/19.0	8.0/10.0	
308	0.08 max.	2.00 max.	1.00 max.	0.04 max.	0.04 max.	19.0/21.0	10.0/12.0	
309	0.20 max.	2.00 max.	1.00 max.	0.04 max.	0.04 max.	22.0/24.0	12.0/15.0	
310	0.25 max.	2.00 max.	1.50 max.	0.04 max.	0.04 max.	24.0/26.0	19.0/22.0	
316	0.10 max.	2.00 max.	1.00 max.	0.04 max.	0.04 max.	16.0/18.0	10.0/14.0	Mo. 1.75/2.50
321	0.10 max.	2.00 max.	1.00 max.	0.04 max.	0.04 max.	17.0/19.0	8.0/11.0	Ti 4 X C min.
347	0.10 max.	2.00 max.	1.00 max.	0.04 max.	0.04 max.	17.0/19.0	9.0/12.0	Cb 8 X C min.

Analysis for Rustless Iron & Steel Corporation.

*P, S or Se—Usual range either 0.18/0.35 S and 0.04 P or 0.18/0.35 Se and 0.12/0.17 P.

TABLE XIII

ANNEALING PROCEDURE, CHROMIUM-NICKEL GROUP III GRADES OF STAINLESS STEEL

AISI Type	Annealing Temperature	Time in Min.	Quench	Hardness Brinell	Hardness Rockwell
301	1750°-2050°F.	10-30	Water	155-175	B 80-90
302	1750°-2050°F.	10-30	Water	140-160	B 75-84
304	1750°-2050°F.	10-30	Water	140-160	B 75-84
303	1800°-2050°F.	10-30	Water	155-175	B 80-90
308	1750°-2050°F.	10-30	Water	145-165	B 75-85
309	1850°-2050°F.	15-30	Water	165-185	B 85-95
310	1900°-1950°F.	10-30	Water	165-185	B 85-95
316	1850°-2050°F.	15-30	Water	140-160	B 75-85
321	1700°-1950°F.	10-30	Water	145-160	B 75-85
347	1700°-2000°F.	10-30	Water	145-165	B 75-85

TABLE XIV

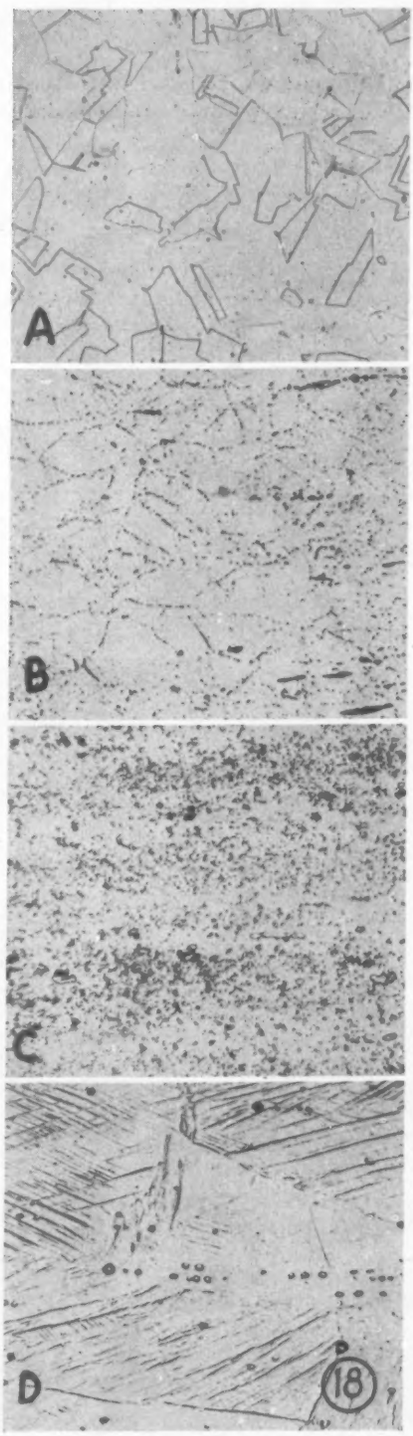
AVERAGE MECHANICAL PROPERTIES OF ANNEALED, CHROMIUM-NICKEL GROUP III GRADES OF STAINLESS STEEL

AISI Type	Hardness Range Brinell	Hardness Range Rockwell	Average Mechanical Properties Ult. Tens. Str. P.S.I.	0.2% Yld. Str. P.S.I.	% Elong. in 2"	Red. of Area %	Izod Impact Range Ft. Lbs.
301	155-175	B 80-90	105,000	45,000	60	70	100-115
302	140-160	B 75-85	85,000	30 000	60	70	100-115
304	140-160	B 75-85	85,000	30,000	60	70	100-115
303	155-175	B 80-90	88,000	33,000	54	60	65- 80
308	145-165	B 75-85	87,000	32.000	55	65	100-115
309	165-185	B 85-95	95.000	45 000	48	67	100-115
310	165-185	B 85-95	95.000	45.000	45	65	100-115
316	140-160	B 75-85	85.000	30.000	60	70	95-110
321	140-160	B 75-85	85.000	30.000	55	70	95-110
347	145-165	B 75-85	87,000	32,000	50	70	95-110

TABLE XV

EFFECT OF STRESS-RELIEVING COLD-WORKED TYPES 302 AND 304 STAINLESS STEEL BARS AND WIRE

Size	Ult. Tens. Str. P.S.I.	0.2% Yld. Str. P.S.I.	Prop. Limit P.S.I.	% Elong. in 2"	Red. of Area %
Condition as Cold Drawn					
1⅛" dia.	108,000	69,000	33,000	39.5	64.5
0.188" dia.	215.000	172,000	64,000	6.0	53.5
0.080" dia.	279,000	265,000	157,000	2.0	
Condition as Cold Drawn Plus Stress Relief 750-800°F. for 1 Hour					
1⅛" dia.	108.000	75,000	42,500	37.0	65.0
0.188" dia.	220.000	194,000	96,500	6.0	57.5
0.080" dia.	300,000	292,000	187,000	2.0	



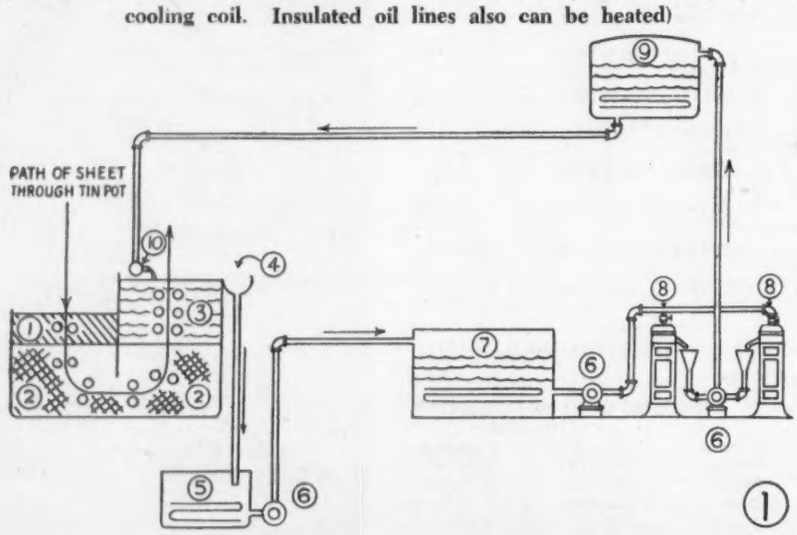
PALM OIL RECOVERY SY

. . . . in Weirton Steel Co.'s tin plate department has resulted in 25 per cent reduction in purchases of new oil, savings in tin and improved quality of plate through elimination of "fish eyes" and other flaws

Legend

1. Flux
2. Tin bath
3. Palm oil
4. Gutter
5. Receiving tank
6. Pumps
7. Sludge & cooling tank
8. Centrifuges
9. Clean palm oil storage
10. Manifold

(All tanks are provided with steam coils. In addition, sludge tank, 7, has cooling coil. Insulated oil lines also can be heated)



COATING of light-gage steel sheets to make tin plate is accomplished by passing them through a molten bath of tin. The sheets pass into the tin bath through a layer of molten flux and emerge from it through a layer of palm oil which assists in the uniform distribution of the coating and protects it during the "freezing" period. A concise statement about the equipment and its operation in this process is quoted as follows from Bulletin 4 of the International Tin Research and Development Council:

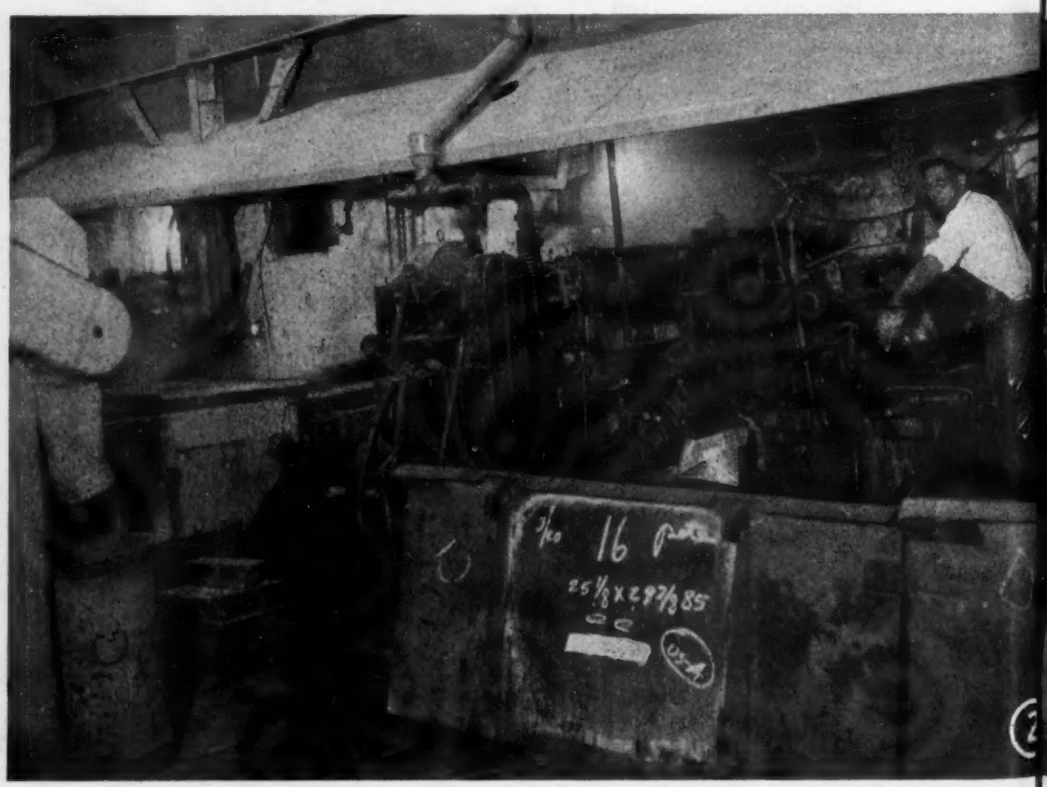
"The tinning apparatus consists of a cast-iron subdivided pot suitably enclosed, and usually gas heated, into which a tinning machine fits. The pot is divided vertically to make two compartments, interconnected at the bottom. A molten tin bath of 2½ to 5 tons occupies the lower portion of the pot; a thin layer of molten zinc chloride flux floats on top in the front compartment and a much deeper bath of palm oil occupies the rear division (Fig. 1). Many of the newer installations use immersion

Fig. 1—Layout of system for cleaning palm oil in tin house of Weirton Steel Co., Weirton, W. Va.

Fig. 2—Operator feeding pickled black plate into tinning machine

Fig. 3—Tin plate being stacked automatically following bran polishing

Fig. 4—General view of installation for centrifuging used palm oil. At rear, left, is sludge tank for dirty oil. Pump in foreground lifts clarified oil to storage tanks above



RY SYSTEM

By H. P. WILKINSON
National Acme Co.
Cleveland

gas heaters inserted in the tin bath in the first or entering division of the pot. These automatically control the temperature closely and are efficient in fuel consumption.

"The tinning machine is essentially a system of rolls for conducting the sheets singly down through the flux and tin bath and up through the palm oil. An important feature, however, is the manner in which the final rolls in the palm oil can be used to press off excess tin, thus regulating the thickness of coating." (Fig. 2)

Use of Palm Oil: Although the temperature at the feed end of the pot may vary from 575 to 650 degrees Fahr., it is important to maintain the palm oil at about 460 to 465 degrees Fahr., or only 10 to 15 degrees above the melting point of tin. Temperatures above 470 degrees in the palm oil are apt to result in a yellow discoloration of the plate. Furthermore, such high temperatures cause polymerization and resultant poor efficiency and high loss of the oil. Therefore, temperature control is necessary. It is the practice to hold palm oil in storage tanks of the system at temperatures between 250 to 350 degrees Fahr. This oil is brought into the bath continuously to maintain the temperature required. New oil is added to the system to replace old oil which has been unavoidably lost on the plate or to replace old oil whose viscosity is too great for proper operation. The amount of new oil added in such cases is a comparatively insignificant amount of the total quantity in circulation in the tin bath.

Solids collect in the oil due to oxidation products of tin which have been removed as the sheet passes through the bath. This "scruff," which is largely iron-tin alloy, tends to settle to the bottom of the bath and tin can be recovered from it when the pot is "drossed."

Cleaning: Bran middlings, oil absorbent, are rubbed over the surface of the sheets to remove most of the oil. Then the plates are carefully polished and mechanically stacked for shipment as they come from these processes. (Fig. 3).

Weirton Steel Co., Weirton, W. Va., through its quality control service, recognized the possibility of improving the quality of hot tin plate by keeping the palm oil free from suspended solids. If this could be done, there could be not only a saving of tin, because of a decrease in tin plate rejects, but the life of the oil in the bath might be prolonged.

Under conventional methods it was customary to dispose of solid matter only at the time of drossing the pots, or when the accumulation of finely divided solids increased the viscosity of the oil too greatly and the oil bath was completely discarded and a new bath placed in service. The discarded oil brought a slightly increased price over that of new oil when sold to soap manufacturers and chemical refineries.

A considerable proportion of the scruff or dross in the bath was not only wasted, but was also one of the causes for production of the flaw called "fish eyes" on the tin plate. Recovery of the tin from the scruff would make available a larger supply of the scarce material (tin) now at a premium because of increased need and decreased supply due to war conditions.

Centrifuge Trial Run: The National Acme centrifuge was chosen as a heavy-duty commercial machine whose bowl capacity is large enough for the collection of considerable quantities of solids between cleanings, and through its simple and rugged design mechanical maintenance is easy. These are important items in labor expenditure and operating cost.

Research leading to the now complete installation in the mill for all tin baths was supervised by the late Fred H. Prahl with the co-operation of the author. A portable centrifuge with circulating pumps was put in the line to continuously clarify the oil in one tin pot. The temperature of the oil as it passed through the centrifuge was 325 degrees Fahr. The plate produced by this experimental pot was carefully examined and compared with the products of the other 16 operating units. Subsequently the oil circulation of other

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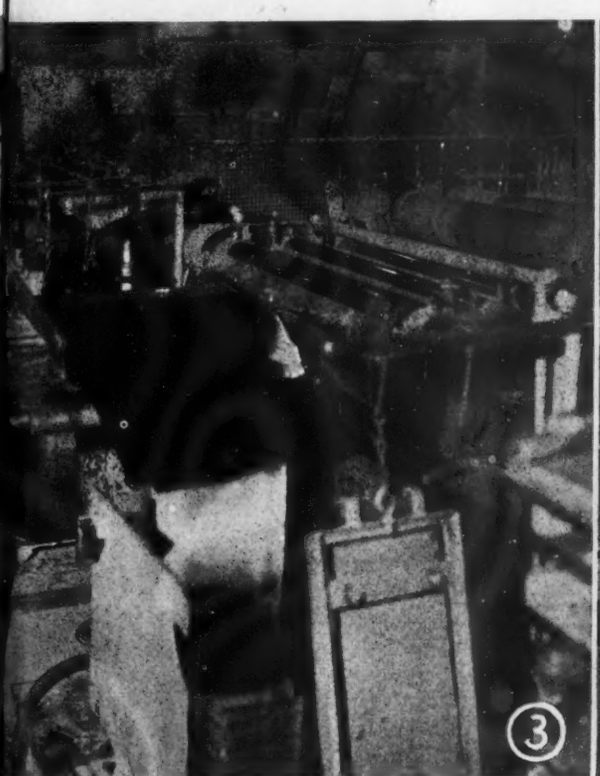
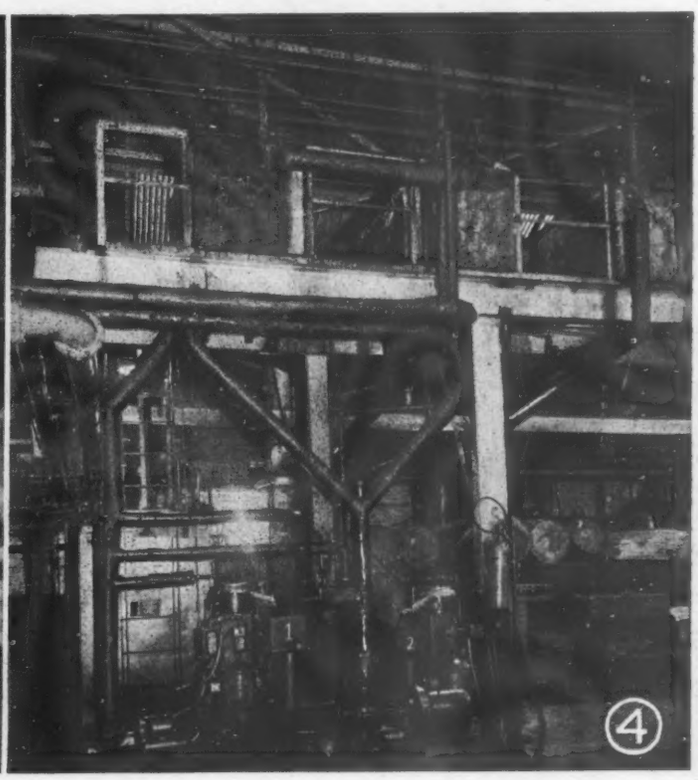
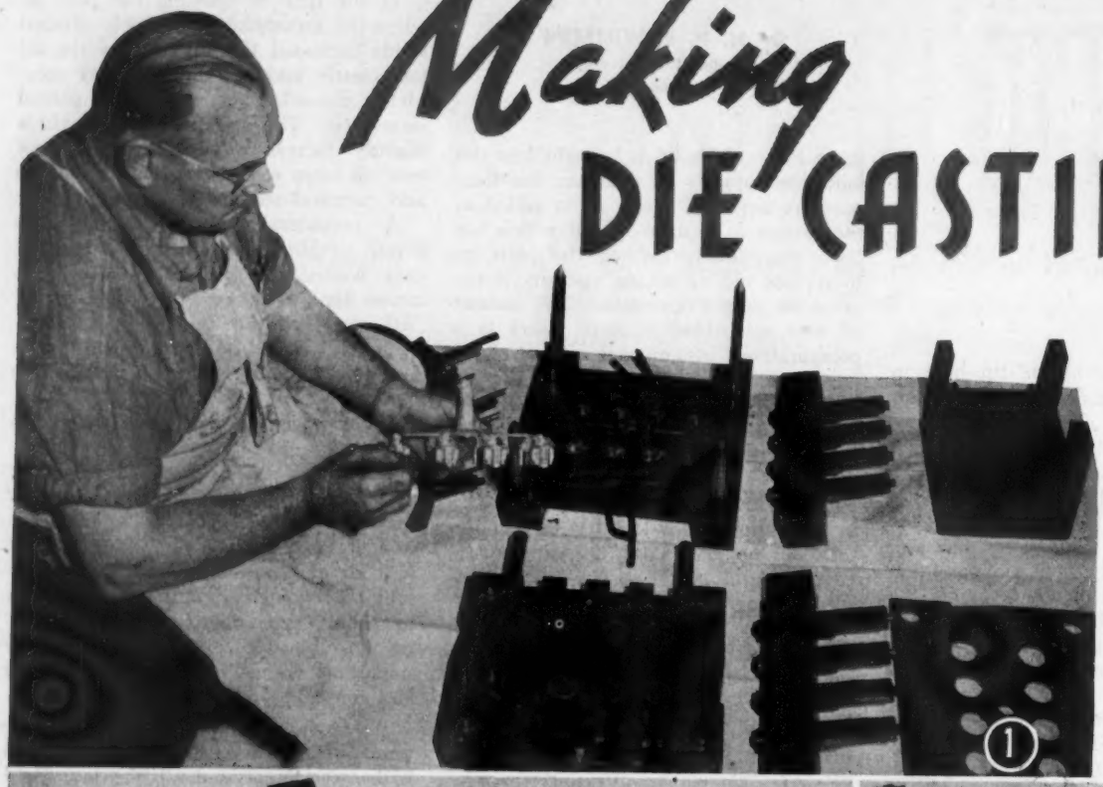




Making DIE CASTINGS



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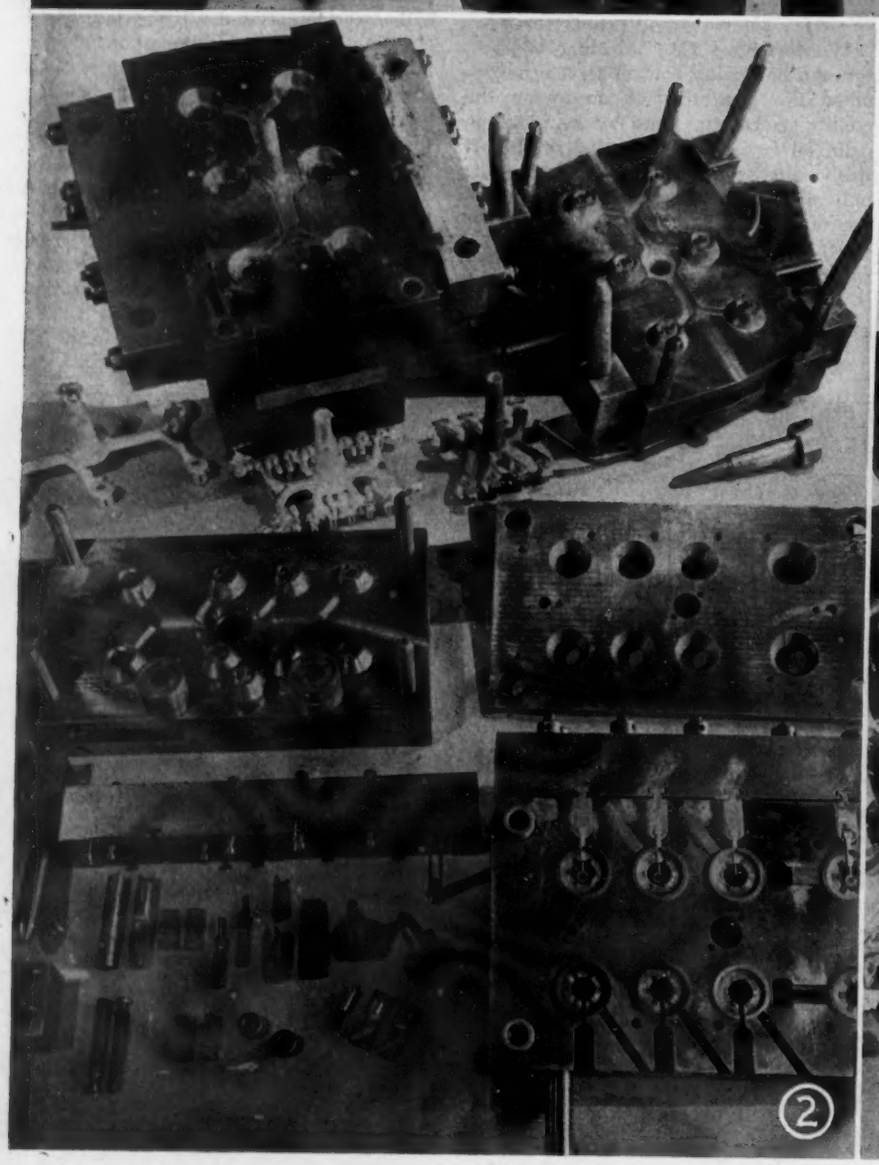

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Details of intricate die design and production methods in Yale & Towne's Stamford plant are described in first of two articles. Machining, finishing and testing procedures will be covered in the April 30 issue of STEEL

By H. E. NAGLE
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YALE locks and padlocks normally require more than 50,000,000 die casting parts a year. Experience with die casting for more than 15 years suggests that the war-accelerated improvements and applications in die casting methods will benefit the manufacture of many other civilian products in the postwar period.

Yale engineers are constantly on the alert to discover better methods of metal fabrication, because of the diversity of the products made by the seven divisions of the Yale & Towne Mfg. Co.

For example, in the Stamford, Conn. division are made locks, builders' hardware, door closers, and rotary pumps. The Philadelphia division makes hand lift and electric industrial trucks, handchain and electric hoists, and industrial, springless, dial scales. The Automatic Transportation Division, Chicago, makes electric industrial trucks; and other divisions in Chicago, North Chicago, Canada and England make products requiring similar processing methods.

This article refers specifically to Yale's Stamford division. Here are facilities for sand casting in all the usual metals, departments devoted to stamping and screw machine operations, machine shops, forge shops, polishing and plating departments and a large die casting department.

On the basis of comparative performance, therefore, we believe that die casting is the best method to attain high speed production of parts for some lines of automotive locks, padlocks, rim latches, cabinet and trunk locks. Practice has taught us to adopt for die casting the zinc base alloys, more specifically the Zamak alloys developed by the New Jersey Zinc Co., New York. Incidentally, its research department has been one of the principal leaders in the perfection of zinc alloys, and this has helped much to increase their industrial application.

The quality hardware dealers at first were won over only slowly to handle locks composed of zinc base die castings, such as those shown in Fig. 4. This trade acceptance of locks employing die castings has, however, not only been retained but greatly widened, due to the constant improvement of the zinc alloys and in die-making.

How Yale Adopted Die Casting: In 1928, it was decided to use die casting in addition to traditional methods of fabricating certain lock parts, following

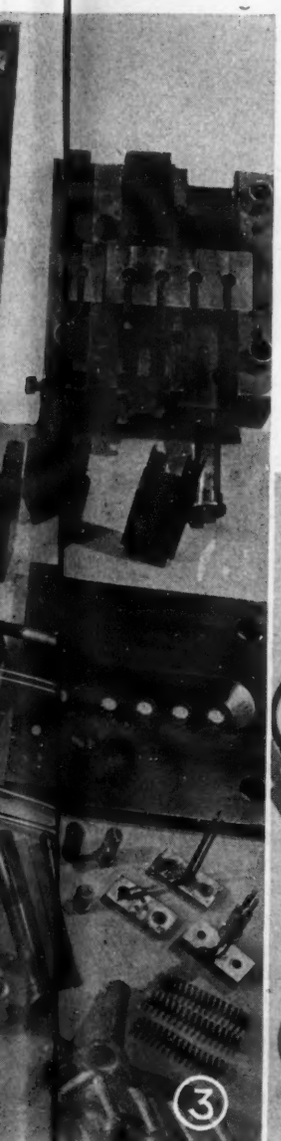
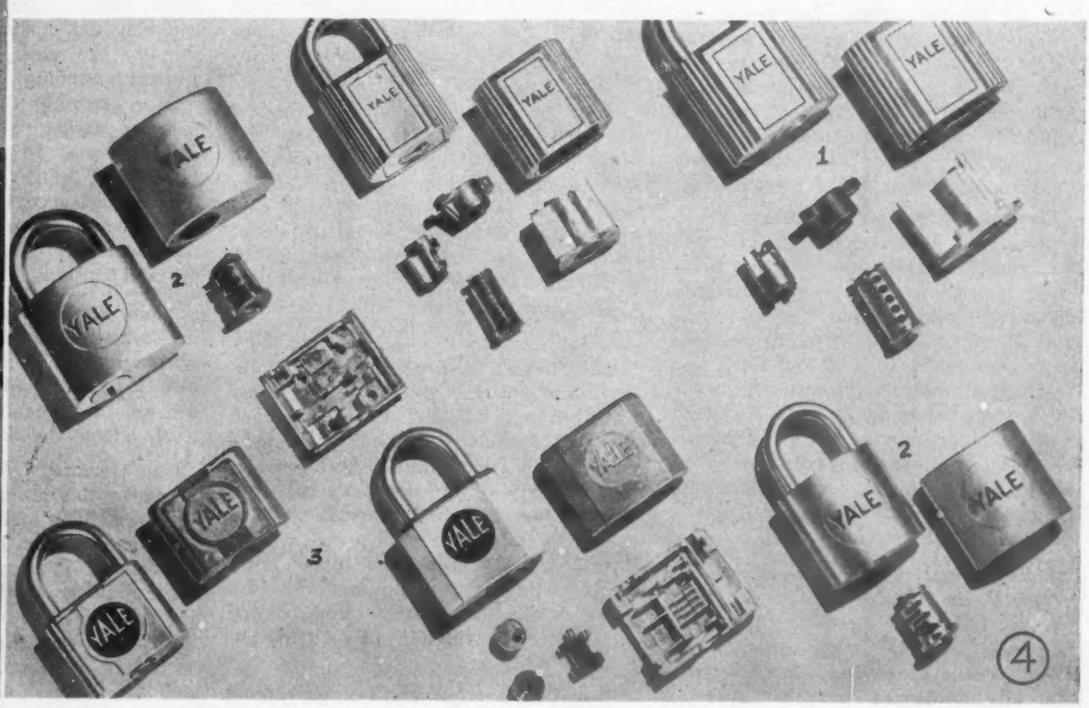


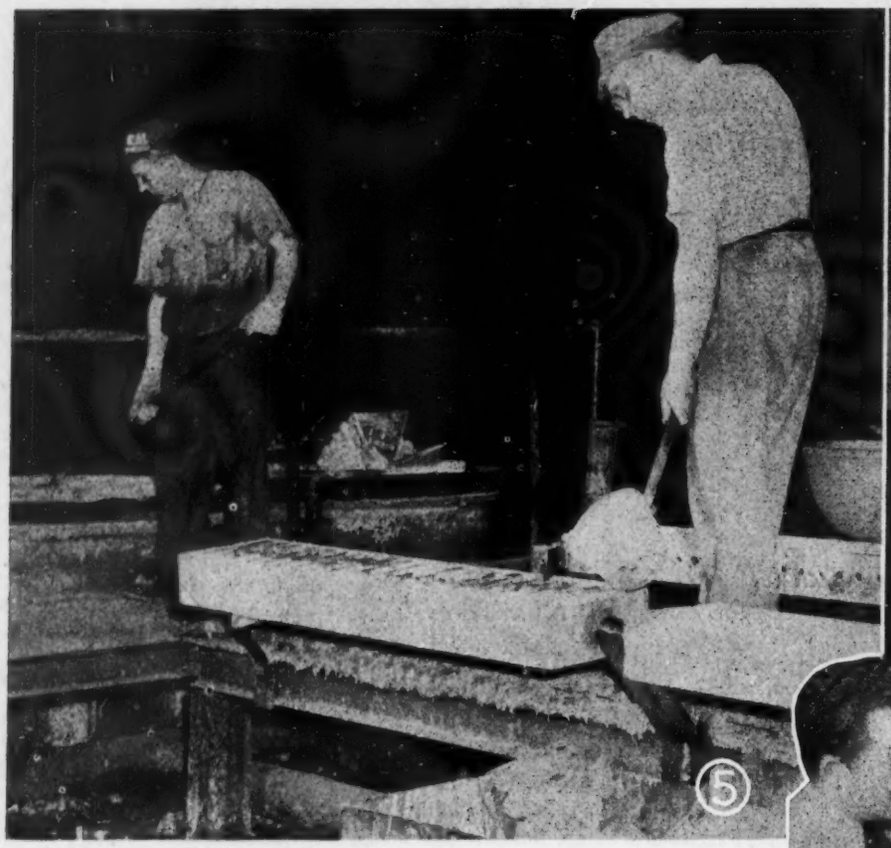
Fig. 1—The die maker is pointing out five pin tumbler holes die cast 0.14-inch center to center and within 0.002-inch tolerance, in the cylinder lock shell for rim latch. Note die inserts used in casting gate of 8 cylinder lock shells. Should a die insert become defective, it is filled temporarily and the other 7 continued in use until replacement or repair of the damaged insert can be effected

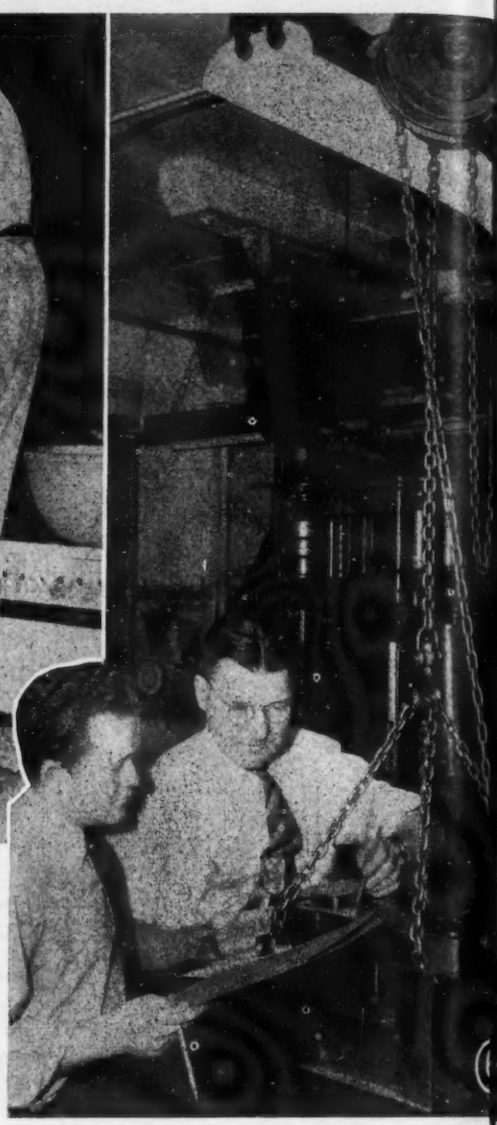
Fig. 2—Three multiple-cored dies are shown here. Note unassembled die at bottom of photo. In each die insert, there are multiple cores for casting the hole for the key and also the five holes for five lock pins

Fig. 3—This die was designed to cast plugs for plate tumbler locks in multiples of 8. In each plug are cast 5 slots for sliding plates operated by the key and the key hole section. Note complexity of core assembly. Under body of die at top right, are shown 4 and 8 sliding side cores which make slots for the plate tumblers and other slots or holes in the side as called for in design of the plug. Slots have walls only 0.02-inch thick and are held to plus or minus 0.002-inch

Fig. 4—Three grades of die cast padlocks are made by Yale & Towne (1) upper right, pin tumbler type; (2) upper left and lower right, disk-tumbler (3) lower left, warded padlocks







successful tests conducted by engineers at the Stamford Division. Improvements in zinc alloys lead to increased applications and wider acceptance of die casting in the lock field and Yale & Towne therefore enlarged its own die casting department.

Today, the Stamford Division uses 180 different dies made at costs ranging from several hundred dollars for a single-cavity die to several thousand dollars for a complex die with multiple cavities, forming 1 to 22 parts in a single "shot". And the 15 die casting machines under normal conditions produce more than 50,000,000 parts a year. Because the castings can be made in such large quantities and require little, if any, additional finishing, costs are lower than by other fabricating methods despite the initial high cost of the original dies.

Designing Die Casting Dies: When a product is accepted for manufacture, the general superintendent assigns it for production analysis to the superintendent of methods. If die casting is one method selected, the parts to be produced are given to the tool designing department, where engineers design the die casting dies under the supervision of mechanical equipment. Die designers have learned much about how to increase the life of the dies by employing certain design principles and by using specially heat-treated die steels.

Since die casting involves forcing molten metal into a steel die under high pressure followed by rapid cooling, precaution is taken in designing the die so that the wide range and rapid temperature changes under which it operates will not shorten its life and thus increase unit costs.

Dies with "inserts" of specially hardened steel are used for the coring and casting sections. These inserts may be individually repaired, or replaced, if worn out or otherwise damaged, without holding up production from the undamaged "inserts." Duplicate "inserts" are kept in reserve for just this purpose. When die casting impressions are cut into a solid die block, the whole die may become worn out far sooner than dies which utilize multiple "inserts."

Thus the higher initial cost in making the better die is greatly offset by the lower unit cost of the castings produced by the longer, more accurate production runs of die castings. For example, one die, using inserts from which a gate of four shells is made for one series of padlocks, has already cast more than 4,000,000 pieces and is still in excellent condition. See Fig. 1.

The "inserts" also permit casting multiple tumbler slots in lock-plugs whose walls are only 0.02-inch thick and which are cast to dimensions accurate within a plus or minus 0.002-inch. Dies are also designed to cast interior parts that will permit room for adding various types of coated finishes. For example, from 0.0002 to 0.0005-inch is allowed for electroplating. Lock interiors often are given a "Cronak" chromate film coating which resists oxidation caused by entrapped moisture.

Yale design engineers are also taking advantage of the wide scope in design now permitted with die casting, at the same time collaborating closely with company die makers and die casters to simplify the dies, improve the quality and surface finish of die castings, and reduce assembly time by combining as many parts as possible into one cast. The aim is to produce a die capable of faster and longer production runs of die castings accurate within a tolerance of plus or minus 0.002-inch, and which, therefore, require a minimum of machining and finishing. See Figs. 2, 3 and 8.

Some dies are designed to make castings with threads that are both accurate within a plus or minus 0.002-inch and also require no additional "chasing" or turning of the core to remove the die casting from the die.

Die Making: From the die design engineers the designs go for execution to the die making room. Here the steel die casting dies are made, inspected, repaired and, if necessary, replaced under the supervision of the general foreman of the die and die casting department. And here, too, are made and maintained the necessary additional dies and fixtures that are used in trimming, broaching,

Fig. 5—Zinc base alloys are made in three 1000-pound capacity pots and cast into small ingots. When production is at peak levels, molten metal is conveyed directly to the die casting machines. Alloying elements, aluminum, copper and magnesium, are melted in smaller crucibles

Fig. 6—Die designer and general foreman of die casting are shown giving a die its regular periodic inspection

Fig. 7—This jig borer is operated in an air conditioned room to insure dimensional accuracies of 0.0001-inch

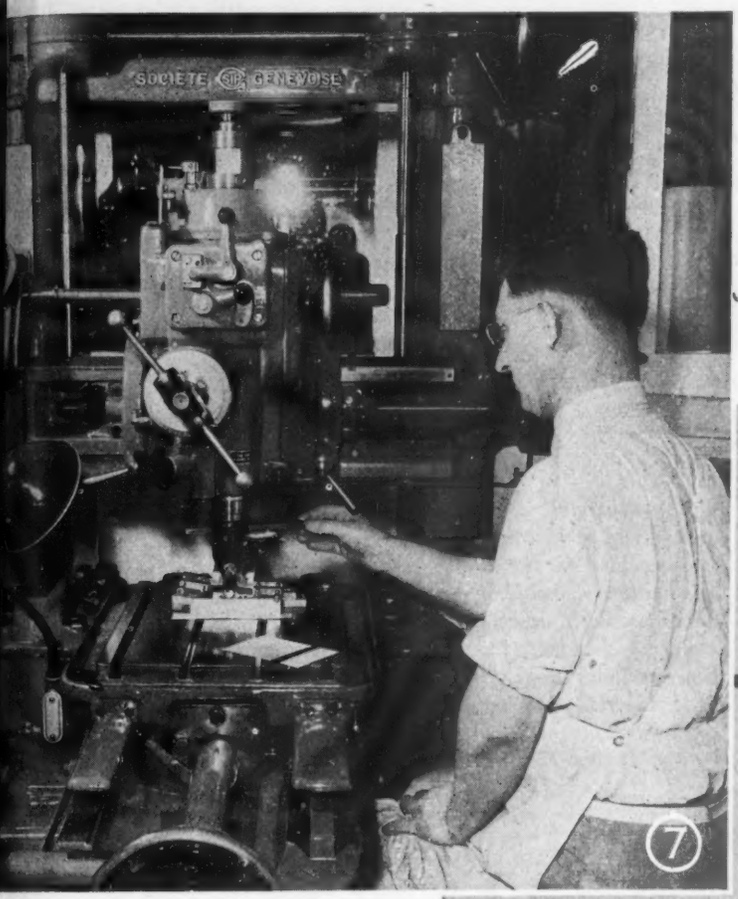
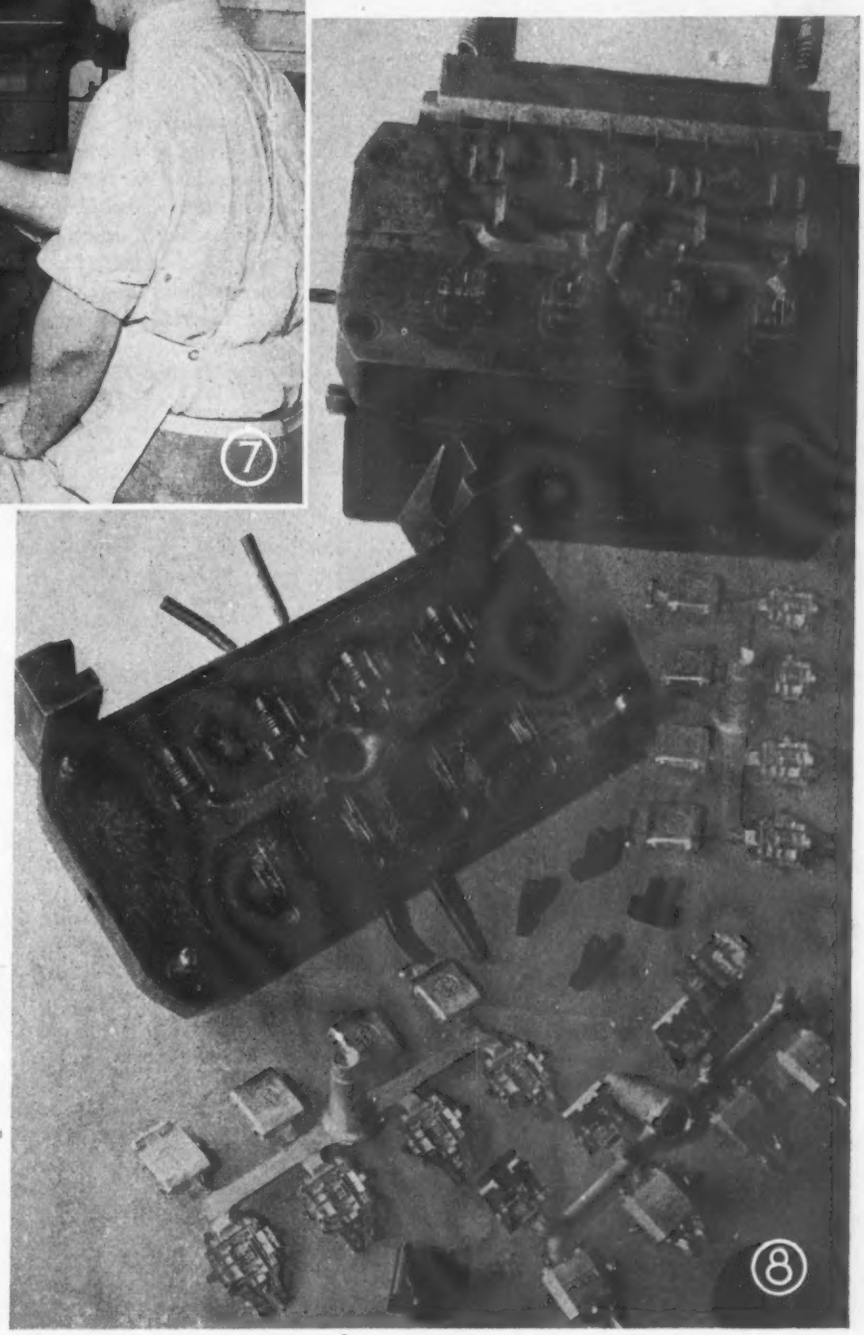


Fig. 8—This die designed not only to cast both halves of 4 padlocks simultaneously but also by means of interchangeable T-shaped inserts (lower die, right side) permit 18 different ward combinations for the key changes. Hob used to form parts of padlock cavities is shown here in right foreground



machining and finishing the die castings.

Precision in making dies is due to trained teamwork. Fourteen of the 15 die makers began their careers in the Yale & Towne apprentice school at Stamford where die casting is emphasized during training. These men work closely and harmoniously with the design engineers and management officials in applying their craftsmanship.

To obtain long die life, Yale has found that it is important to utilize the best possible steels needed to meet the special function of each part of the die. In this way, the die more successfully resists wear and tear and mechanical and thermal fatigue. Dies in operation are maintained at about 350 degrees Fahr. to minimize the thermal shock caused by the infusion of molten zinc alloy into the die and the subsequent rapid cooling needed before ejecting the die castings at rates ranging from 150 to over 300 per hour.

Die steels are purchased in slabs which are machined to size. Base of the die is now made from Aldivar steel made by Latrobe Electric Steel Co., Latrobe, Pa. For the cores and inserts, Hot Form steel is used and for hobs, Air Hard

steel, both produced by Vanadium-Alloys Steel Corp., Latrobe, Pa.

A die is carefully inspected after a few "shots" are made with it to insure that it is producing die castings to desired tolerances and proper surface finish. After a die has completed its production run, it is again inspected (Fig. 6) and, if necessary, repaired before storing. Thus careful "preventive maintenance" adds considerable life to die.

The die-making department equipment includes a Kearney & Trecker rotary head milling machine, four Bridgeport vertical millers, and a Swiss jig-borer (Fig. 7) which is accurate to 0.0001-inch with adjustments so sensitive that it requires a separate, air-conditioned room lighted by a special Mazda fluorescent lamp that gives off a minimum of heat.

Dies vary in size but rarely exceed 18 x 18 inches at the casting surfaces. Many contain all component parts of an assembled product. Thus the proper number of parts is cast simultaneously, and, with subsequent, almost-automatic sorting when the die castings are broken from their gate binders, a further increase in production is possible. See Fig. 10.

The Die Casting Alloy: The quality of a die casting depends on the purity of the alloy from which it is made as much as upon the design and manufacture of the die for making it. Yale castings are, therefore, produced under rigid chemical and physical inspection control. Precaution is taken to prevent contamination of the zinc base alloy. Sample castings from each casting machine are regularly sent to the Yale & Towne laboratory for chemical tests, and to a commercial laboratory for spectrographic analysis.

In line with its policy of finding and utilizing the best methods of metal fabrication, Yale engineers are making extensive studies of various types of nonferrous alloys that may be die cast. Stamford engineers, for example, have been studying how brass alloys may be more efficiently employed in fabricating locks and hardware. Because of the exceedingly high temperature, upwards of 1500 degrees Fahr., required to die-cast the copper alloys, the ordinary dies become damaged from thermal shock after comparatively short production runs. This, of course, would result in a much higher unit cost of the finished product.

While brass die-castings are superior in mechanical properties and in retaining physical constants, zinc die castings have other outstanding advantages in the manufacture of certain locks and padlocks. The zinc die casting has a fine surface finish, is comparable to sandcast brass alloys in mechanical and physical properties, and is easier and more quickly cast to any desired size. For some commercial products, very thin sections of 0.050 to 0.070-inch are cast. The zinc base alloy allows almost any complexity in shape, holds its dimensional accuracy under a wide range of conditions, and can be cast with steel dies capable of long runs.

The die casting alloy used consists of 99.99 per cent pure zinc, plus a hardener composed of small amounts of aluminum, copper and magnesium. Castings made of this Zamak alloy are tested for tensile strength of 40,300 p.s.i., compressive strength of 60,500 pounds, impact strength of 43 foot pounds on a ¾ x ¼-inch bar and brinell hardness of 82.

Large normal requirements make it advantageous to make the zinc alloy in our own plant. The melting room is adjacent both to the room in which the die casting machines are operated and to the storage rooms for the raw materials. An outside loading platform services the melting room, which normally uses two to three carloads of zinc monthly. Yale industrial trucks expedite the handling of this heavy raw material from freight car to storage and then to the melting pots as needed.

Three large melting pots (Fig. 5), each capable of melting and mixing 1000 pounds of zinc alloy materials are used. For mixing and melting the copper-aluminum-magnesium hardener for the zinc alloy, a battery of smaller melting pots is employed. The metal is cast into conveniently sized ingots stored for use as needed by the die casting machines in the adjacent room.

When peak production requires it, the molten alloy is carried in ladles directly to the die casting machines, thus re-

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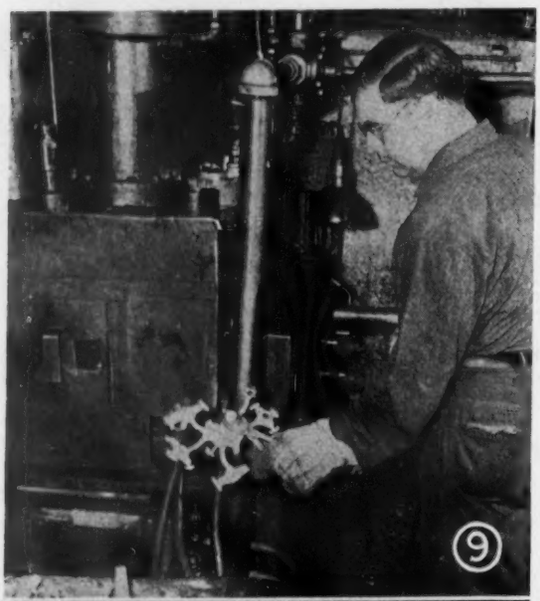
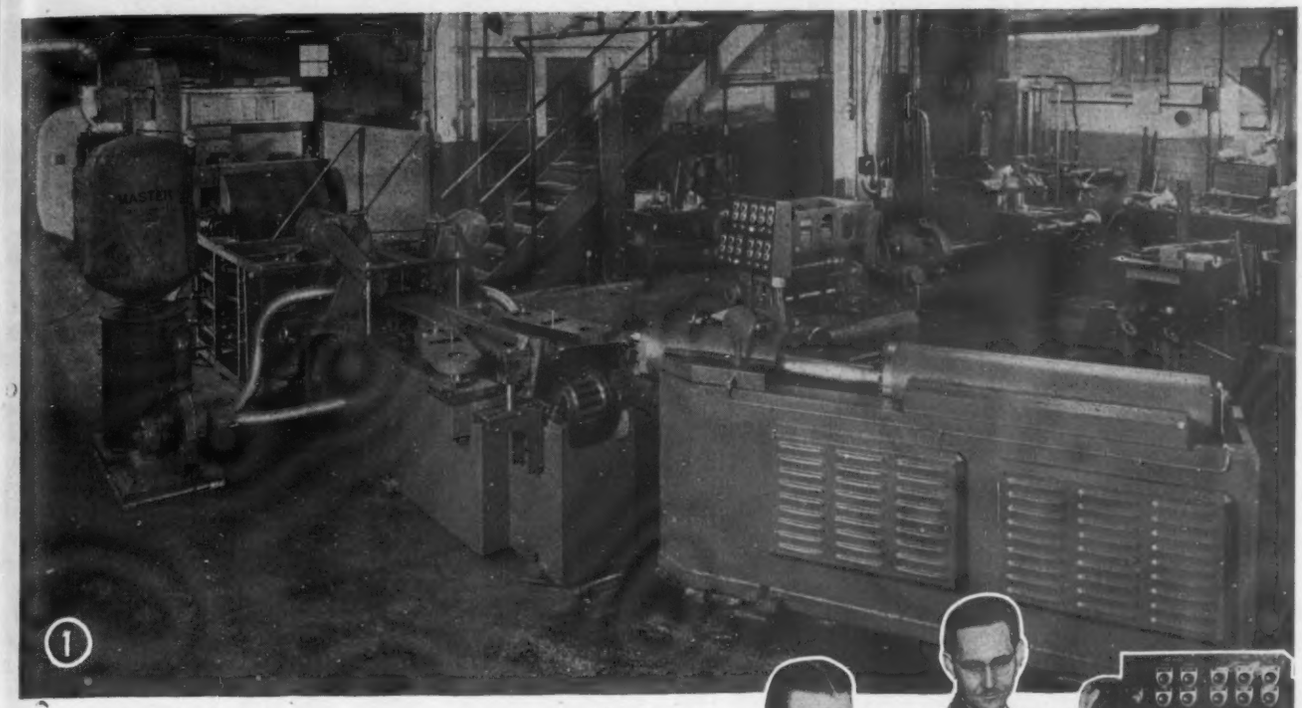


Fig. 9—Operator is removing gate of 6 castings from machine for set of lock hardware, including 2 door handles, 2 roses, a retainer and a bolt. Fifteen machines used include 12 built by Yale, one by Schultz and two by Madison-Kipp

Fig. 10—Castings are conveniently removed and sorted with this setup. The sprue is held by a tubular fixture, permitting the operator to readily break off the individual castings into chutes which convey them to tote boxes



Welding Rod PRODUCTION

Manganese alloy electrodes roll into final inspection station at rate of 350 per minute in new plant. Unusual die head, new type flux press and compact 7-pass oven are features of continuous unit which completely eliminates manual handling

Fig. 1—Overall view of new complete welding rod processing plant

Fig. 2—One man at the main operating station can control entire unit. Rods to be coated in die head are fed from between rolls on table under control panel. Pressure exerted by flux press literally shoots rods on to conveyor where they are stopped by backup plate in foreground

PROCESSING of welding rods, as performed by one of the newest complete plants of its kind, closely approaches straight-line production. Designed and built as a key unit in the expansion program of the American Manganese Steel division of American Brake Shoe Co., Chicago, this unit when at capacity will produce 350 coated rods of manganese alloy per minute.

Smooth operation of the plant, shown in Fig. 1, and uniformity of electrode coatings is achieved by the newly designed die head, in which flux is extruded on to the wire at a 60-degree angle from normal direction of rod flow, rather than at right angles as in conventional die heads. This feature is illustrated in Figs. 2 and 3. Also of interest is a new type flux press conceived by the same designer, Ernest P. Moslo, president, Moslo Machinery Co., Cleveland, which built the plant. Installed with a hydraulic piston partly below floor level, this press can be charged and the flux removed at the operator's waist height. Fast production of flux, with a minimum of operator fatigue, are among advantages indicated.

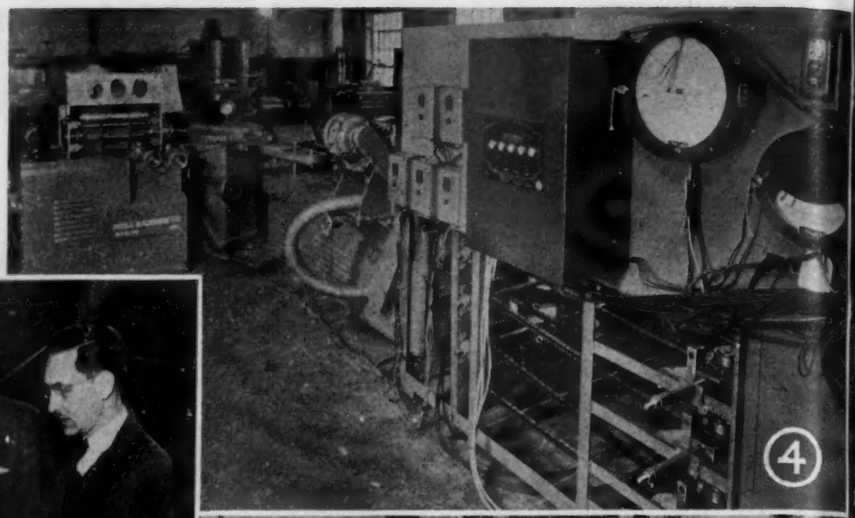
Additional features, apart from the new principle of flux application, are: A centralized control panel by which a single operator can control the entire unit; a compact 7-pass oven, saving 45 per cent of the floor space required for similar capacity; and improved handling of electrodes throughout operation.

Production of electrodes by this plant proceeds in four distinct stages: (1) Preparation of wire, (2) preparation of flux, (3) combining wire and flux, and (4) subsequent drying of flux, third and fourth stages being continuous.

Wire is fed through a straightening and cutting machine which cuts it into lengths about 14 inches long. It then is deposited in a hopper mounted on the rod feeder table immediately behind control panel (see Fig. 1). The rods drop down a chute one at a time. In a movement synchronized with the flux press and conveyor, they are pushed by a kicker through the two smooth rolls shown immediately below control station in Figs. 2 and 3. The rods move forward in a continuous line, end to end. Unremitting pressure is applied to force the rods, one by one, into the die head and flux it contains. As mentioned, the flux is extruded by press into the die head at a 60-degree angle to unite with the wire as it goes through the die chamber, pressure of 10,000 p.s.i. insuring good bond between rod and flux and,

Fig. 4—Recording instruments and safety controls for compact, 7-pass oven. Note feeding machine at extreme left

Fig. 5—Open-sided table in center carries driving mechanism. Bench at left is final inspection station



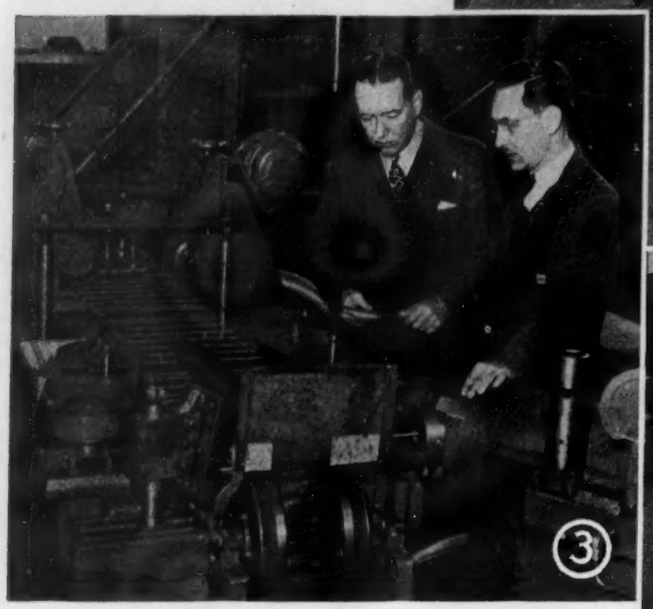


Fig. 3—After passing a pair of abrasive belts for smoothing up ends (also shown in Fig. 2), coated rods move past power-driven brushes to clean ends for contact in welding. Vacuum system removes dust

at the same time, giving terrific impetus to rod travel.

Flux previously has been mixed thoroughly in a mixing machine and formed by a hydraulic press into cylinders or slugs, these slugs of flux being inserted in the cylinder of the extrusion press which carries the die head.

As the evenly coated rod is catapulted from die head, it is guided into proper position on the conveyor by a direction plate and brought to an abrupt halt by a baffle plate, both shown in Fig. 2. Serrations in the moving belt hold rods at regular intervals and prevent them from rolling off on to the floor. From this point, rods are carried past a pair of abrasive belts, also shown in Fig. 2, which remove surplus material from the two ends of each rod, leaving them square. They next pass between power-driven brushes, located on line (Fig. 1) just beyond abrasive belts, where the ends are cleaned for contact necessary in actual welding operations. Dust is drawn off by a vacuum system. After brushing, electrodes move into the new 7-pass oven conveyor system in which they are carried through different controlled degrees of heat, air and moisture and placed (not dropped) on successive conveyors as they pass through the oven. Recording instruments and controls for the oven are shown in Fig. 4. Motors and mechanism for driving the entire conveyor, including the handling system within oven, are shown in Fig. 5.

From the oven, electrodes are conveyed to an inspection table (also to be seen in Fig. 5.) where they are inspected and packaged for delivery. Conveyor proceeds from the furnace on to bottom level of drive table (Fig. 5), crosses this lower tier and drops the electrodes, still separated one from another, upon lugs of the elevator which raises them to the inspection table. Links of two idler chains, protruding slightly above deck of the inspection table, carry the finished electrodes to the end of the inspection station.

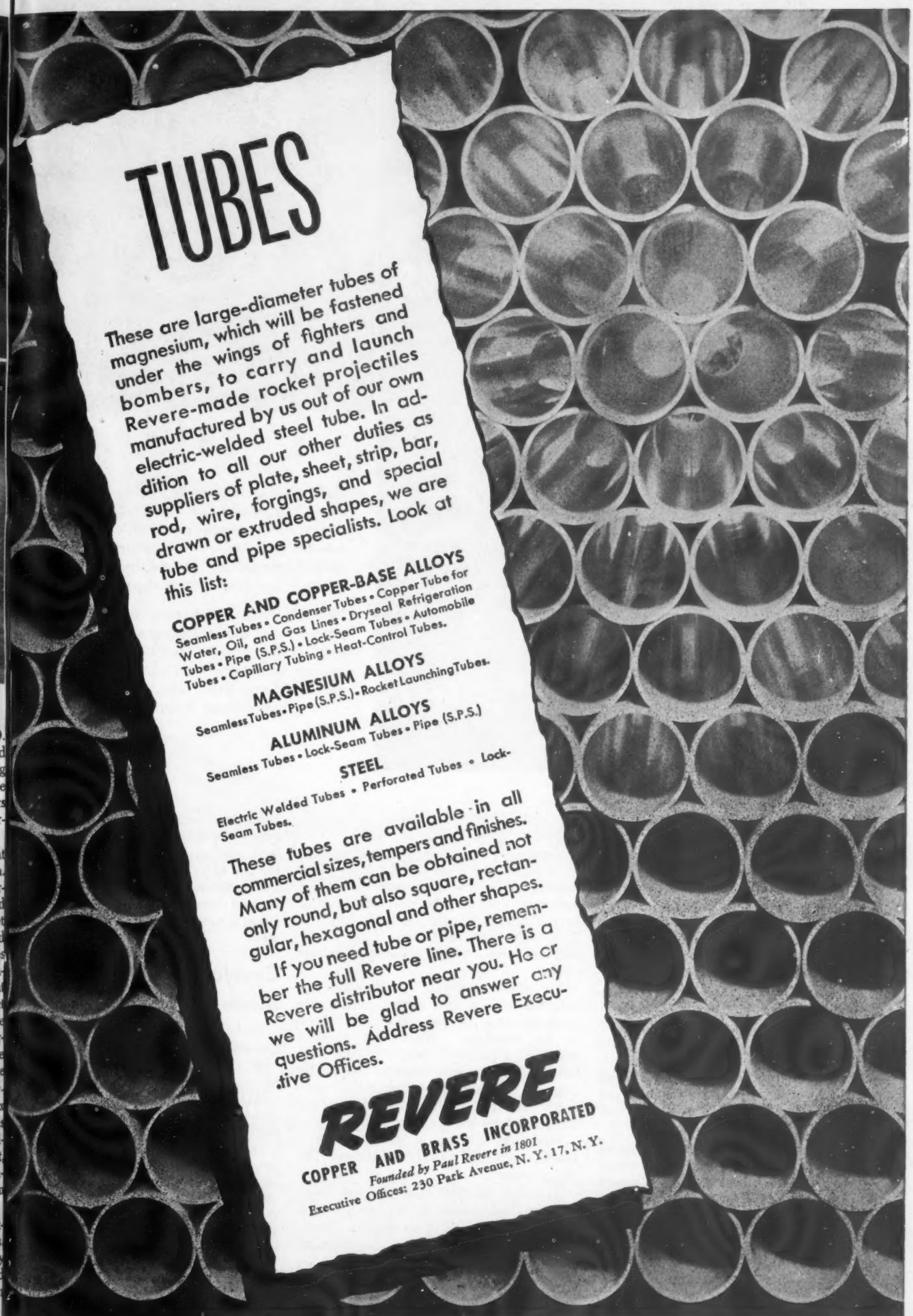
Inasmuch as they drew special attention during demonstrations of this plant, design of die head, arrangement of oven, and the electronic safety control and transfer mechanism merit more complete description.

Actually, there are two dies in the head, which may be seen with an electrode projecting from it in Fig. 3, these dies being arranged in tandem in the center of the die chamber. As flux is forced into the chamber within the die head, this space is filled completely, including the space between the two dies. Diameter of aperture in first die is only enough larger than that of the bare rod to permit the latter to enter the die head. Rod then is forced into the dense mass of flux, where it receives its coating in passage. The second die has an O.D. dimension conforming to that of finished electrode specifications, thus removing surplus flux. Pressure built up in the mass within die chamber literally shoots electrodes out of the die head like arrows.

A number of radical changes in heat treatment are incorporated in the oven. Continuous chain conveyor is so arranged that the seven passes are housed in an insulated chamber less than 4 feet high and 25 feet long. Closely controlled humidity is applied to the first two passes and a damper-balanced duct system insures constant circulation. Excess heat and humidity are evacuated to a duct for connection to the outside of the building. An insulated partition separates the first passes from the rest of the travel. Temperature and humidity are graduated to control the speed of drying, insuring the specified degree of flux hardness in the finished rod. Oven is built in sections which, like the individual production machine in the plant, can be shipped as assembled units, minimizing the problems of erection when delivered.

The transfer mechanism has attracted keen interest during demonstrations. An ingenious revolving carrier literally picks up the rods from one pass and places them in the same alignment on

(*Please turn to Page* 140)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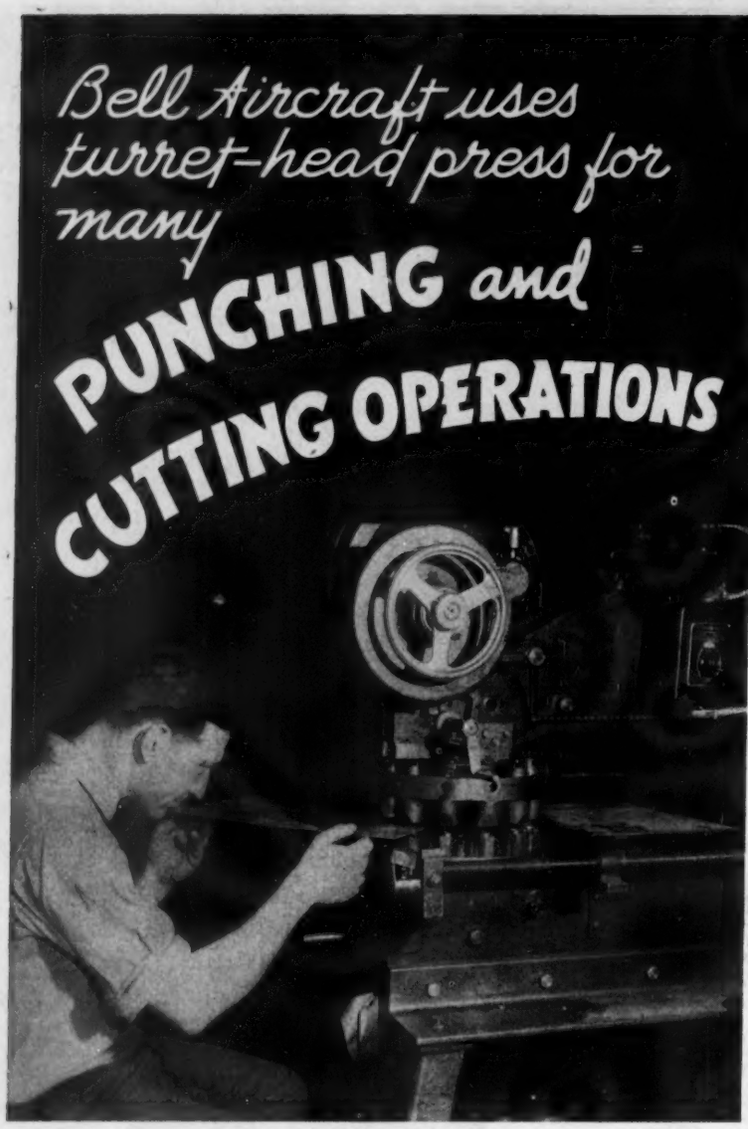
Bell Aircraft uses turret-head press for many PUNCHING and CUTTING OPERATIONS



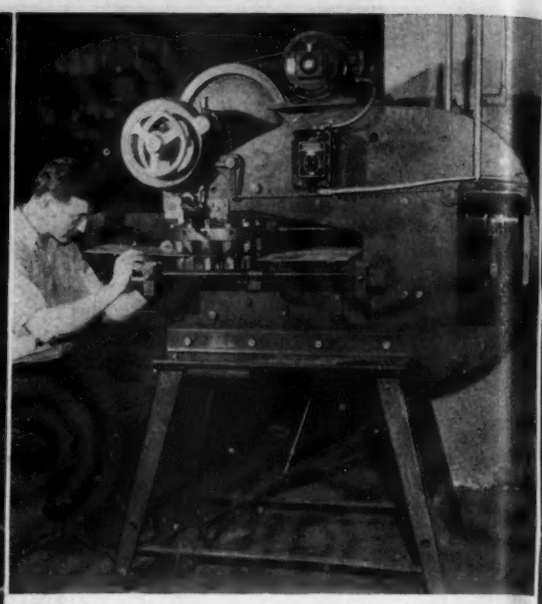


Fig. 1 (left)—A versatile machine at Bell Aircraft Corp., Buffalo, is the Wiedemann power driven turret punch press which carries 17 punches and dies on the rotating head, plus a cutter designed by an employe. Worker is shown punching hole in sheet metal stock

Fig. 2 (above)—Full view of turret punch press showing worker feeding sheet stock to pinpoint locator on each of the 17 punches. Variety of dies on rotating head makes it possible to punch different-sized holes on same piece of stock without inserting new die

A "Jack-of-all-Trades" in the rework department of Bell Aircraft Corp. fighter plane facilities at Buffalo is the Wiedemann power driven turret punch press. The machine, which is Type R11P-150, can be used for a wide variety of punching operations and only recently was easily adapted for a cutting operation which formerly had baffled the department.

In an average day, more than a score different sections of sheet stock, generally an aluminum alloy, may be handled by the electrically driven press. The machine is used for operations for which it would be impractical to make a special die or when a fairly small number of pieces require punching one or more holes.

It will punch—cleanly and accurately—material including bakelite, which is used for cable guides on Bell-built Kingcobras and Airacomets, laminated brass strips, that are inclined to tear in regular drilling, steel up to a thickness of one-eighth inch, and aluminum sheets to a thickness of ¼-inch. Punching of metal as thick as ¼-inch is rarely done at Bell for it has been found that to insure satisfactory results the operation should be confined to stock 3/16-inch and under.

Simple to operate, the machine has 17 punches and dies on the turret. The rotating head can be swung under the operating cam to take punches ranging from 3/16 to 1-inch. It will punch a 7/16-inch hole in ¼-inch solid metal and will force a 1-inch opening in ⅛-inch stock.

To obtain accurate performance, a template is used as a pattern and a pinpoint insertion is centered on the piece to be stamped. When fed to the machine, a pinpoint locator on the bottom of the punch connects with the pinpoint hole and the operator then proceeds with the punching operation which is initiated by pressing on a foot bar.

Half-hole cutting is not considered feasible since it quickly wears out the die or punch.

Although the Wiedemann press saves considerable money by its diversity, it is limited to special, low quantity schedules, not adapted to heavy production.

In a recent rework problem, an employe of the department produced the answer to trimming 3/32-inch from odd-shaped hard steel springs by designing a blade fitting for the machine. The springs could not be trimmed satisfactorily on an ordinary shear and punch, but the newly-contrived cutter, for which the employe received a C.D.S. (Conception Data Sheet) bonus, handled the job and saved 400 manhours on the operation.

Circular Slide Rule Made of Plastic Material

An unbreakable slide rule that can be carried in a brief case and remain accurate under the roughest handling, the Monitor slide rule, is produced by Tavella Sales Co. It is a circular rule, 6 inches in diameter, and contains all the features of an ordinary slide rule plus a multiplication-division table 13.8 inches long, as against 10 inches on the regular 10-inch rule. Instrument is easily cleaned, greaseproof, and may be trampled on and immersed in liquids without impairing its usefulness. It is fabricated by Sillcocks-Miller Co. from dimensionally stable Vinylite white opaque sheets over-laminated with Vinylite transparent sheets, products of Bakelite Corp., 30 East 42nd, New York 17.

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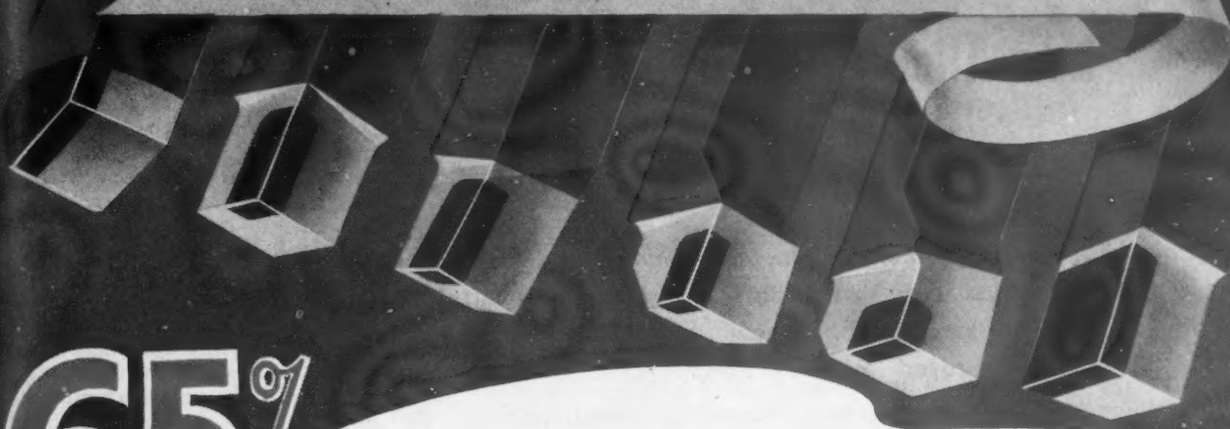

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NEW EFFICIENCY which can be accomplished with the low-alloy, high strength steels now available indicates that a careful re-examination of all equipment, machinery, and structures is in order. Virtually all mobile structures can be redesigned for greater efficiency of operation, with equal or longer service life, and this frequently can be accomplished without any increase in initial cost. Many structures which do not move in transportation, yet have moving parts, can be improved structures such as loading devices, road building machinery, agricultural implements, gates for dams and locks, mine skips, and the like. This applies also to some static structures whose components must move great distances to reach their ultimate destination, perhaps in export to remote parts of the world where transportation facilities are inadequate, and handling charges very costly. Bridges and buildings may often be improved substantially and reduced in cost through proper employment of these new steels. Already, this is working to the advantage of our foreign competition in certain European countries.

In the long run, the materials best suited for a given service will prove the most economical in that service, and the quicker steel discovers those applications where it cannot compete with the nonferrous metals, and vice versa, the quicker both will forge ahead toward maximum employment. It is gratifying indeed that the railroads, which constitute one of the greatest potential markets in the transportation field, are now conducting a thorough study of the economies of weight reduction in rolling stock, under the auspices of the Association of American Railroads. It is well that they are, because statistics of the American Railway Car institute show that 539,000, or 30.7 per cent, of the freight cars owned by Class I railroads are over 25 years old. Another 299,000, or 17 per cent, are 21 to 25 years old. By the time the older cars have been retired and replaced with new equipment, the second group—aged 21 to 25 years—will be good subjects for replacement, and another 365,000 cars, or 21 per cent, now in late middle life will be creeping up to retirement age.

Considering the rapidly accelerating progress now being made in all of the technical arts related to our subject, it is reasonable to assume that obsolescence has become a greater factor in determining the profitable life span of equipment than old age itself. This observation is supported by the substantial operating economies made possibly by the lighter, more efficient rolling stock which has already given such a good account of itself in actual service.

During the five years from 1935 to 1939 inclusive, a period commencing just one year after these new steels were introduced, 35,027 of a total of 152,108 new freight cars installed by Class I railroads were built wholly, or in part, of one of the leading high-strength steels of this group. This comprises 23 per cent of the new equipment installed, and the cars were distributed over 24 Class I railroads. Over this same period, with 1940 added, 7117 new light-weight freight cars of various types were installed on 18 Class II and III railroads, private lines, and, through export, on a number of foreign lines.

Turning to the progress which had been made prior to the war in light-weight passenger cars, it is interesting to note that a total of 1458 passenger cars were delivered to the railroads during the period 1934 to 1939. Of this total, only 84, or 5.8 per cent, were built of conventional design using ordinary carbon steel; 159, or 10.9 per cent, were of aluminum; 290, or 19.9 per cent, of stainless steel; and 925, or 63.4 per cent, of low-alloy, high-strength steel. It is safe to say that no passenger cars of conventional design employing ordinary carbon steel will be built in the future, but the other materials will be used in various combinations to provide the utmost in weight saving, passenger comfort and safety.

By F. D. FOOTE
President
Alloys Development Corp.
Pittsburgh

High-strength steels were developed to fill a need in the transportation field for properties in steel superior to those possessed by the conventional structural grades commonly used. Some years ago a survey of leading engineers in this field disclosed a growing consciousness of excessive dead weight in transportation equipment. These engineers were asked what was required in the way of superior properties to provide lighter and more efficient designs, while at the same time sacrificing nothing in maintenance costs or in service life of the equipment. Their requirements were almost identical. They wanted greater strength to permit a substantial increase in unit stresses, and thereby make possible a proportionate decrease in section modulus. This meant the employment of lighter gages and, consequently, their next demand was for a greater degree of resistance to corrosion in order that the rate of attack would be retarded to a point equivalent to the reductions made in the sections employed.

Superior Fabricating Qualities

Next they required a composition that could be formed easily, hot or cold; readily welded without heat treatment, and generally without the need of subsequent annealing, or stress relieving. It was essential also that these properties should be provided in the as-rolled condition of the steel because it was obvious that such large structures as railroad freight and passenger cars, street cars, and barges could not be subjected to heat treatment after fabrication. Lastly, it was asked that all of these superior properties should be integrated in a steel of relatively low cost. Added up, this seemed quite a large order, and it proved to be, but the market-building possibilities were so clearly indicated that they provided a sufficient spur to the ingenuity of the metallurgists, and thus this new type of steel was created.

Recently a definition of steel compositions which qualify as low-alloy, high-strength steels has been promulgated. This definition specifies the following:

The term "low-alloy, high-strength steel" is meant to include steels to which moderate amounts of alloying elements have been added, imparting in the as-hot-rolled condition a yield point of 50,000 pounds per square inch minimum, in sections ½-inch thick and lighter, and which experience indicates will result in atmospheric corrosion resistance four to six times that of mild steel.

The degree of corrosion resistance specified is determined by unstressed samples exposed for long periods of time in industrial, rural, coastwise, and other atmospheres. This atmospheric corrosion resistance of four to six times mild steel has resulted in added service life of coal-carrying equipment equivalent to approximately 2¼ times the service life of similar equipment built of equal section in ordinary steel. Many corrosion tests of

Inspecting cylinder finning tools in the Wood-Ridge plant of the Wright Aeronautical Corporation. Photograph courtesy the Wright Aeronautical Corp.

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some of these steels have now been carried on in this country, for a period of 10 years and longer. Several abroad—notably those instituted by the Corrosion Committee of the British Iron and Steel Institute—have run for more than 5 years. The British tests were conducted in various industrial atmospheres in the British Isles, and in various other atmospheres throughout the Empire, including those of both the temperate and tropical zones.

The added per pound cost of the new steels, when compared with the cost of ordinary carbon steel, is about in the ratio of their yield points. Hence, the unit cost of the lighter structures employing high-strength steel is frequently no more than that of similar structures in ordinary steel. When the fabricators have become thoroughly familiar with the use of these steels in the different structures which they produce, there would seem to be little doubt that the unit cost of the improved structures will be lowered substantially.

A standard A. A. R. box car in carbon steel weighs about 45,000 pounds. Box cars of the same inside dimensions and identical equipment, built of all-welded, high-strength steel, weigh about 36,000 pounds—a saving of 4½ tons per car.

A standard A. A. R. hopper car on 50-ton trucks in ordinary steel weighs about 42,000 pounds. Modern light-weight hopper cars providing increased pay load capacity, equal to the amount of weight saved, can be built to weigh 32,000 to 33,000 pounds, using standard A.A.R. specialties. These cars would have a life expectancy equal to or longer than that of the heavier designs built of ordinary steel. In 1935, 115 extremely light hopper cars were built on 50-ton trucks which weighed only 30,500 pounds. All of them were placed in operation late in that year on four different railroads, and are just completing 10 full years of service. The side and end sheets of the cars, and also the upper slope floor sheets, were 3/32-inch thick, as compared with a normal thickness of $\frac{5}{16}$-inch in carbon steel. The lower slope floor sheets were ⅛-inch thick and the hopper sheets 5/32-inch, as compared with normal thicknesses in carbon steel of ¼-inch and $\frac{5}{16}$-inch. One hundred of these cars have been used in coal and ore service requiring them to pass through car dumpers at the end of each trip. An inspection report at the end of 9 years of service gave no indication of a time when the cars would need to be put in shop for heavy repairs. These cars were designed with a capacity to carry 6 additional tons of coal, when compared with conventional carbon steel cars of standard A.A.R. design.

Lighter Railroad Cars

The weight of a main line passenger coach was formerly about 80 tons. Cars built in the past 10 years of high-strength steel and all-welded design, and with the same seating capacity, average about 55 tons—a saving of 25 tons per car, including the extra weight of air conditioning. This saving in weight is accomplished at no sacrifice in car life or safety. In fact, due to design improvements, all-welded construction, and the use of high-strength steel, the new cars have an increased safety factor over the older and heavier ones. This increased safety has been measured by tests and also by the behavior of the cars themselves in road accidents.

Modern Pullman cars have employed low-alloy, high strength steel in their outside sheathing and stress-carrying members. Their smooth appearance is due to their all-welded construction. Because of their lighter weight, longer trains can be carried with the same motive power.

It is interesting to note how weight saving spirals in these new passenger car designs. Because of the substantial reduction made in body weight, it is possible to employ 4-wheel trucks in place of the 6-wheel trucks previously required to operate the older and heavier cars. This eliminates one-third of the wheels employed per car, and contributes handsomely to the overall reduction in weight. In general, the redesign of all types of structures for the use of high-strength materials results in such multiplications of weight saving from top to bottom.

Some structures to which low-alloy, high strength steels have been applied, other than in railroad cars, are as follows:

The capacity of a mine skip was increased from 7½ to 10 tons of coal without increasing the load on the hoisting equipment.

Fifteen Tainter gates, each 75 feet in length (longer than any similar gates previously constructed), were used in a dam in the Mississippi river. These lighter gates made possible a substantial decrease in the weight of the lifting chains, operating machinery and supporting structures.

On an all-welded barge ¼-inch high-strength steel side and bottom plates were substituted for the $\frac{5}{16}$-inch thickness formerly used, and $\frac{5}{16}$-inch bulkhead plates for ¼-inch. These reductions afforded an increased load capacity. A derrick mounted on the deck of this barge had a 40-foot boom of high-strength steel which was lighter than the wood boom previously used.

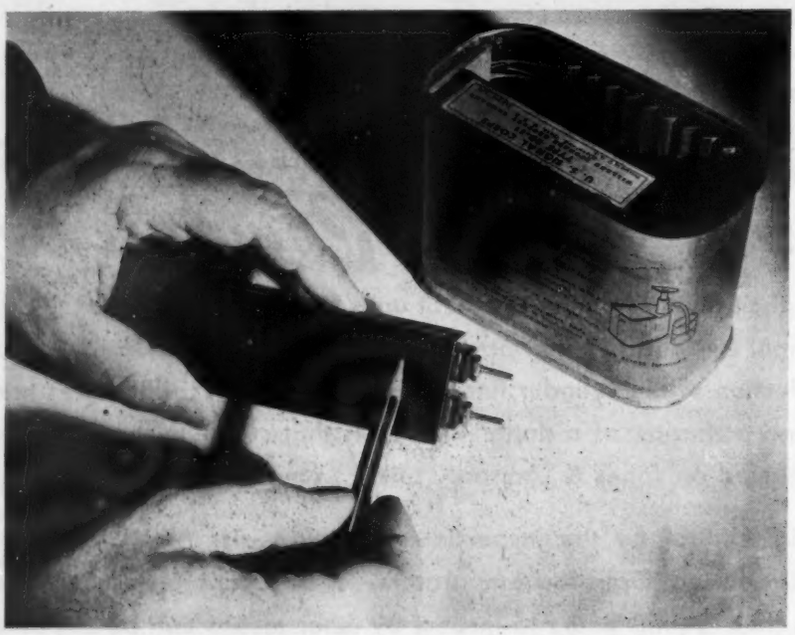
High-strength steel was used in the design of a number of highway trailers constructed for the transportation of automobiles. A weight saving of 1200 pounds per unit was achieved, effecting substantial reductions in operating costs.

A substantial increase was needed in a side wall coal loading machine located at Hampton Roads, Virginia. The piling under the pier was already loaded to capacity. The necessary weight saving was accomplished through the use of high-strength steels, thus avoiding a costly reconstruction of the pier itself.

In simple terms the salient fact is that through the light-weight development, its creators are trying to do a modern job of merchandising, based upon superior materials and sound engineering, generously spiced with imagination!

—o—

An 8-page illustrated bulletin entitled "New Wrinkles in Finishing" is available from New Wrinkle Inc., 1771 Springfield, Dayton 3. It includes applications for one-coat wrinkle finishes.



VACUUM-PACKED BATTERIES: A container, which employs the vacuum-pack principle used in packaging foods for safe-keeping, is made by American Can Co. for Willard storage batteries used by the Army Signal Corps in obtaining weather information by radio. When the can is punctured, acid is drawn into the 18 tiny holes in the battery. Fluted partitions hold the battery clear of the sides of the can. Formerly it was necessary to fill each of these little cells with a hypodermic needle

You know him, Pal, as the man who took you for a run in the park when the leaves were falling. He's the tweed-suited chap who wrestled with you on the floor or read the paper while you stretched out at his feet. He's the fellow you're waiting for.

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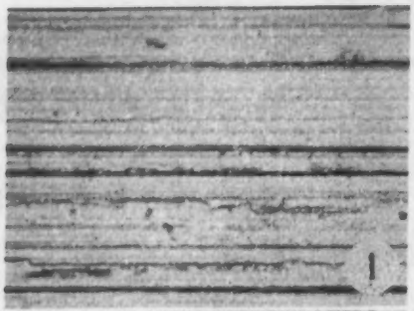
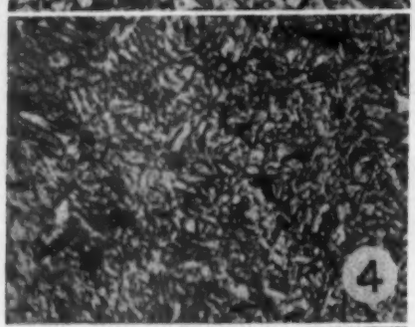
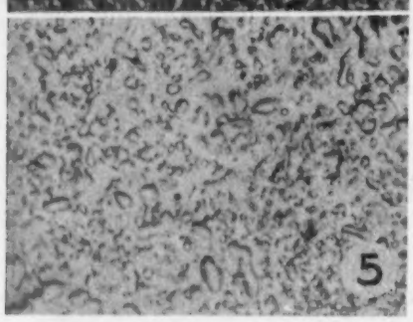






electropolishing of Steel

for microscopic examination

By S. R. PRANCE
Chief Metallurgist
Inland Mfg. Division
General Motors Corp.
Dayton, O.

ELECTROLYTIC polishing for microscopic examination of steel has proved to be a time-saver as well as an extremely useful process for the metallographer. This development has taken place in a relatively few years, as it was not used widely until the advent of war, when control of quality and machinability necessitated increased use of microexamination by the metallurgist.

Briefly, electrolytic polishing may be termed "anodic corrosion", wherein the sample serves as the anode and the polish is obtained by selective removal of metal from the surface of the sample in a suitable electrolyte. An inexperienced operator using this method can obtain a smooth surface free from scratches and disturbed metal.

In our laboratory we used the following procedure:

Electrolyte always is aged for 24 hours and approximately 1/2 per cent of iron or aluminum is dissolved in this electrolyte by use of the dummy anodes. Recommended formula for the electrolyte is 800 cubic centimeters of glacial acetic acid and 200 cubic centimeters of a 70 per cent solution of perchloric acid.

The samples are prepared, after cut-off, by facing on 80-100 grit grinding wheels and followed by short-time preparation on No. 1 metallographic emery paper. There is a slight advantage in additional surfacing on "O" and "OO" metallographic emery paper. Most of our samples are prepared as far as No. 1 paper and the results are good enough

Fig. 1—Sample preparation before electropolishing, not etched. Final grit size No. 120. X1000

Fig. 2—Type 4135 steel, full anneal, 2 per cent nital etch. X1000

Fig. 3—Type 4135 steel, normalized from 1650 degrees Fahr. 2 per cent nital etch. X1000

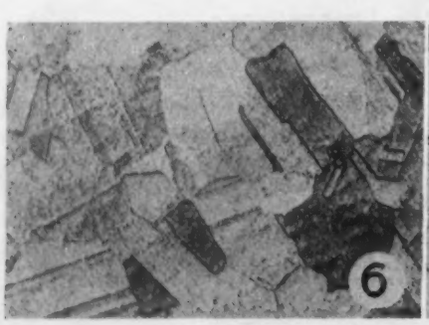
Fig. 4—Type 8745 steel, hardened and tempered to rockwell 40-45 C. 2 per cent nital etch. X750

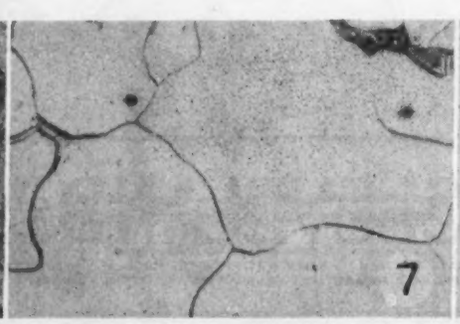
Fig. 5—Drill rod, spheroidized anneal, 2 per cent nital etch X1000

Fig. 6 — Stainless steel 18-8, quenched in water from 1950 degrees Fahr. Etch is copper sulphate and HCl. X400

Fig. 7—Hot steel "as forged." 2 per cent nital etch. X400

Fig. 8—SAE 1020 steel, "as forged." 2 per cent nital etch. X400





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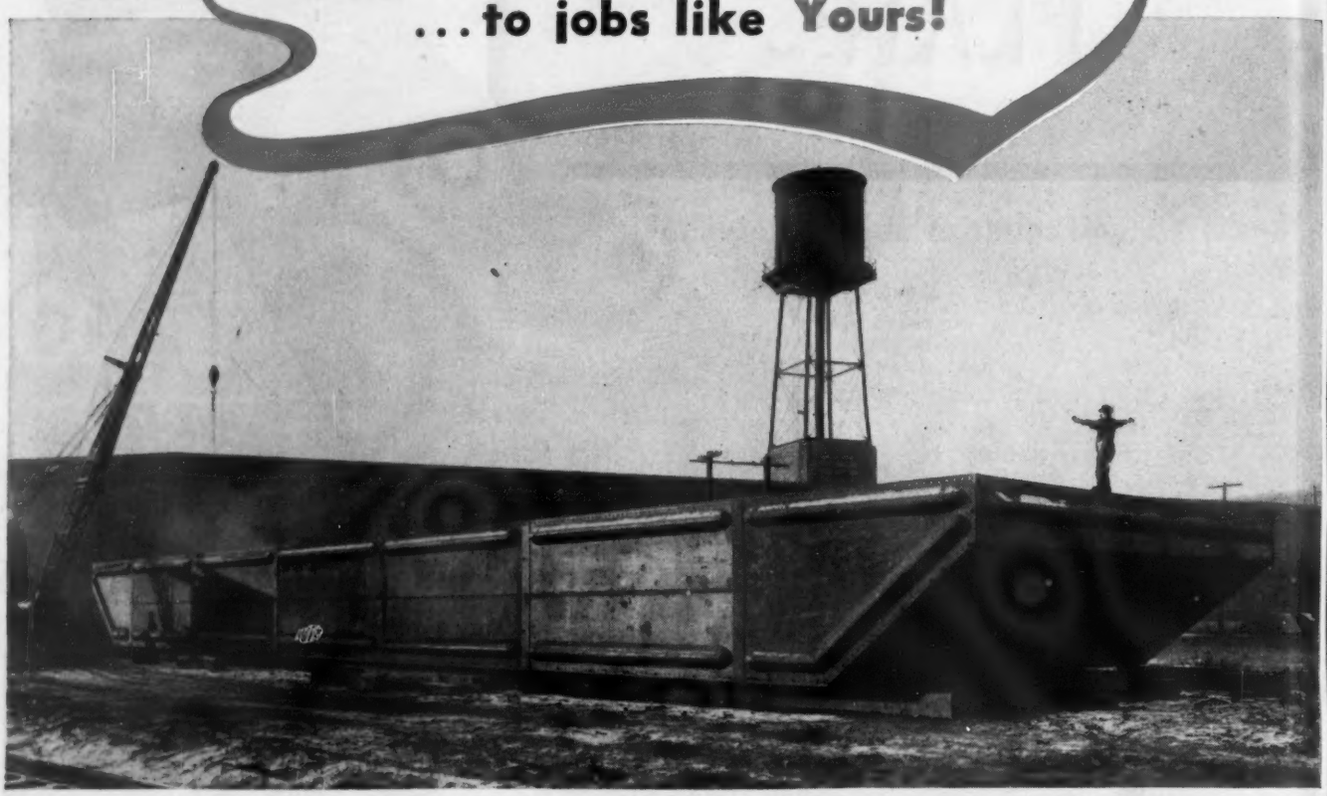

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After preparation, the sample is attached to the anode lead, the generator is turned on, and the sample is agitated for 1½ to 4 minutes, depending upon the size and hardness of sample being electropolished. Normally, for a 1-inch square surface, our time element is 2 minutes; this is especially true on heat-treated and annealed samples. To date, we have not been successful in using this process for nonmetallic inclusions.

When using a generator, the sample is removed while current is still maintained, to avoid etching. Wash the sample immediately to prevent staining. (Washing should be done in running hot water). Then air dry and etch with usual etching reagents.

Precautions and Points To Be Observed: Organic material must not enter the bath and care must be taken in mixing the two acids in the electrolyte. The glacial acetic acids should be slowly added to the perchloric acid when mixing the electrolyte. It should be kept cool during mixing; if solution becomes hot, stop mixing and allow to cool before any further mixing.

Any DC current source may be used, if 30 volts or more are obtained. If over 30 volts, any variable resistor may be used to bring voltage into the required 27-33 volt range. Relationship between size of sample and distance between sample and cathode will affect the current density and/or voltage. In our polishing equipment, we endeavor to maintain 27-33 volts across the cell, and even though current density is affected as stated, successful results have been maintained over a range of 1½ to 3½ inches distance, sample to cathode relationship. Generally, a 1-inch square surface, polished at a distance of approximately 3½ inches from the cathode, gives approximately 30 volts; a surface of 0.1-square inch gives approximately 30 volts at 2½ inches distance from the cathode. Although current density is a factor, good results are obtained by regulating distances and voltages as stated.

At present the laboratory is using a 125-volt generator with a lamp bank resistor in series parallel with the circuit. (See diagram, Fig. 9).

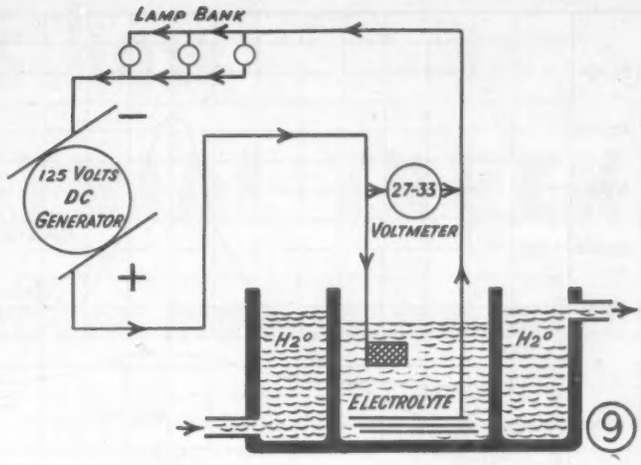


Fig. 9 — Diagram of Prance set-up for electrolytic polishing of metallographic specimens. All data and illustrations obtained from "Production Data," published by E. F. Houghton & Co., Philadelphia

Cell: The cell may be earthenware, glass or vitreous coated steel. This cell is immersed in a metal tank equipped for running water to keep electrolyte below 85 degrees Fahr.

Cathodes: The cathode may be aluminum, ingot iron, Swedish iron or SAE 1010. Stainless steels, such as 18-8, may be used.

Agitation: The solution or the sample may be mechanically agitated. If mechanical agitation is not available, good results may be obtained by hand agitating during electropolishing.

Continuous Cast Rod Produced from Bronze

Continuous cast bronzes, as applied to forms to be machined or used as-cast, help to meet the demands of war production for greater volume and finer quality with less manpower, according to Ampco Metal Inc., Milwaukee 4. Certain alloys previously available only as sand, permanent mold, or centrifugal castings are now produced by a continuous casting process in mill length rods of superior quality. As such they are adapted to fabrication on automatic screw machines and present an opportunity for improved production and large economies.

Rod is produced by continuous withdrawal of metal from the bottom of a casting crucible. The metal is solidified as it leaves the crucible and passes through a suitably cooled die of closely held dimensions. It is guided by driving rolls to a traveling cut-off device which engages at proper intervals to yield rods of good surface, uniform diameter and even length. Dirt and drosses do not enter the solidifying rod, gases are eliminated upwards, and the molten bath presents a steady hydrostatic head to prevent formation of shrinkage cavities. Structure is said to be uniform metallographically. Lead or other secondary constituents are uniformly dispersed in a finely divided state across the entire section.

At present the following Ampcoloy bronzes are available as continuous cast rod, meeting chemical and physical properties of the specification indicated: AMS 4845B, SAE 62, Ampcoloy 742, tin bronze; WA6824B, Ampcoloy 342, high lead bronze; and SAE 660, Ampcoloy 382, bearing bronze.

Benefits which may be expected from use of this material are said to be: Improved quality of production; faster production; smaller volume of material to purchase, receive and handle; less scrap accumulation, cleaner shop, more space, manpower savings; better tool life; and lower power production costs.

Film Processing Unit Is Self-Contained

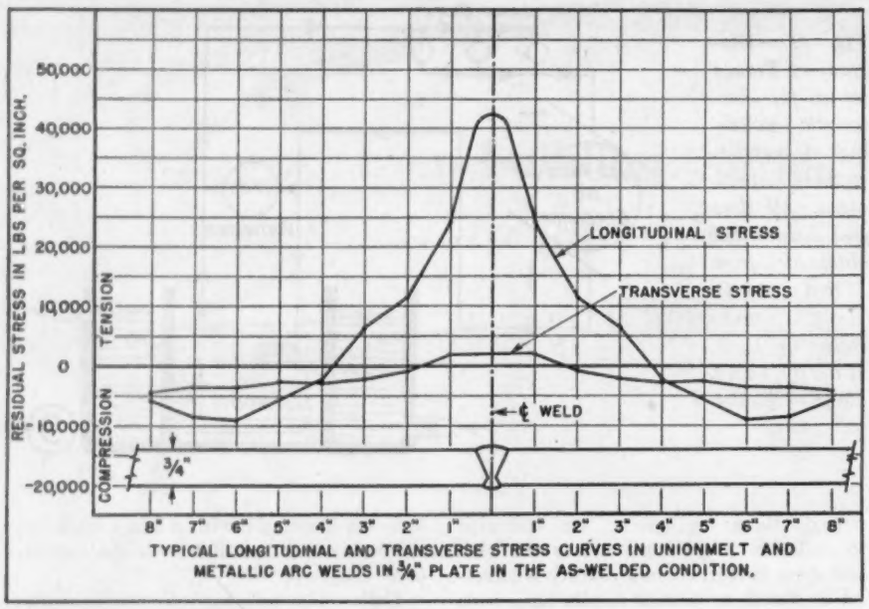
A film processing machine, Model 11, for 16-millimeter negative, positive and reversal film has been developed by Houston Corp., Los Angeles. It is a compact, portable unit, 64 inches long, 54 inches high, and 24 inches wide. It has a processing capacity of 15 feet of reversal film per minute, 5 feet of negative film per minute at 8 minutes' developing time, and 20 feet of positive film per minute at 2 minutes' developing time. Where developing tanks are used for negative and positive films only, without reversal solutions, films may be processed at a rate up to 16 feet per minute.

Machine is a self-contained unit, requiring no additional equipment. When connected to electrical power, water supply, and drain, it is ready for operation. It is operated in white light. Film is driven by top rollers with floating bottom elevators to assure threading ease and uniform film tension throughout processing. Water jacket, solution tanks, super structure and power cabinet, as well as shafts, pipes, brackets, bearings, etc., are made of stainless steel. A control panel including stop-start switch, pilot light for flashing lamps, solution thermometer, speed indicator and footage counter, is conveniently located. Drying is done by infra-red lamps. A 110 alternating current is used, and amount of load is 4 kilovolt-amperes.

Catalog Describes Abrasive Cutting Machine

A new 8-page catalog describes an abrasive cutting machine, Hudorkut Model No. 1, manufactured by Andrew C. Campbell Division, American Chain & Cable Co. Inc., Bridgeport 2, Conn. It contains interior and exterior photographs of the machine, photographs of typical pieces cut, and close-ups of cutting action.

Machines are designed to cut up to 4 inches smoothly and cleanly. All material is cut while immersed in coolant. This abrasive cutting machine is said to be useful in laboratory or metallurgical work.



TYPICAL LONGITUDINAL AND TRANSVERSE STRESS CURVES IN UNIONMELT AND METALLIC ARC WELDS IN ¾" PLATE IN THE AS-WELDED CONDITION.

Fig. 1 (left)—Typical longitudinal and transverse stress curves in Unionmelt and metallic arc welds in ¾-inch plate in as-welded condition. This data is reproduced through the courtesy of The Welding Journal

Danger of Failure in Welded Structures Greatly Reduced by

LOW-TEMPERATURE STRESS RELIEF

Low cost, non-detrimental application of heat ranging from 350 to 400 degrees Fahr. relieves both longitudinal and transverse stresses. Minimum yield point value affords durability and safety in shipbuilding

By
T. W. GREENE
Engineer
The Linde Air Products Co.
New York
and
A. A. HOLZBAUR
Assistant Welding Engineer
Sun Shipbuilding and Drydock Co.
Chester, Pa.

STRESS magnitude and direction, and its reduction or elimination, has been studied intensively in stress analysis investigations during recent years. Stresses can be divided into two classes, those parallel to the weld and those at right angles or transverse to the weld. Stresses in longitudinal direction are of yield point magnitude and are virtually unaffected by welding procedure or sequence. Stresses transverse to the weld are lower in intensity and may be minimized by proper welding procedure and sequence.

Recognized since the inception of welding, these stresses probably have contributed to welded structure failure, particularly those of yield point value parallel to the weld. These may be reduced to a safe value by stress relieving the entire weldment at temperatures from 1100 to 1200 degrees Fahr. Although effective, this method is expensive and cannot be applied to large welded structures such as a ship. Local high temperature stress relief applied to the weld has been found to be ineffective and frequently detrimental.

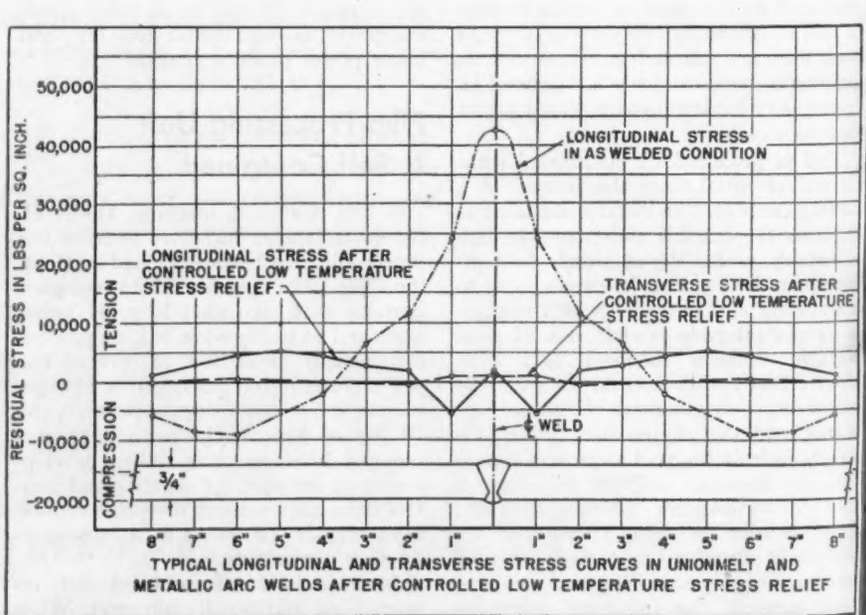
A new stress relief method, utilizing controlled low temperature, has been conceived by Harry E. Kennedy of Berkley, Calif., and has had careful experimental study and laboratory investigation. In September, 1943, Linde Air Products Co. and Sun Shipbuilding and Drydock Co. started an extensive co-operative investigation of this method of stress relief as well as means of applying it to critical ship welds.

At the shipbuilder's drydock in Chester, Pa. a series of weldments were made and the actual magnitude of stresses in as-welded condition and their locations in specimens were determined. This investigation covered welds in plates of various thicknesses utilizing unionmelt and manual metallic arc butt welds typical of those used in ship fabrication. To assure consistent results, plates used during early investigations were furnace stress relieved after beveling and then welded. Later it was found that preliminary stress relieving of plates had no effect on results. Standard welding procedures were used.

Magnitude and location of longitudinal and transverse stresses are shown in Fig. 1. These are typical of both methods of welding. The weld is in tension. Longitudinal stresses in weld approximate yield strength of weld metal and range from 40,000 to 50,000 pounds per square inch. Weld area longitudinal stresses are held in equilibrium by opposing compression stresses on each side of the weld area.

Weldment stresses are in proportion to the degree of restraint offered to the free contraction of weld metal and heat-affected zones. In a transverse direction this restraint is a function of the struc-

(*Please turn to Page* 142)



TYPICAL LONGITUDINAL AND TRANSVERSE STRESS CURVES IN UNIONMELT AND METALLIC ARC WELDS AFTER CONTROLLED LOW TEMPERATURE STRESS RELIEF

Fig. 2 (right)—Typical longitudinal and transverse stress curves in Unionmelt and metallic arc welds after application of low temperature stress relief

Here's how
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Conserve manpower – Reduce manufacturing cost

In your search for ways of conserving man hours and reducing cost, it will pay you to carefully scrutinize your handling methods. Investigation has shown that materials handling frequently accounts for 50 to 60% of production time. Listed below are a few of the many ways industrial trucks can help you reduce this percentage importantly.

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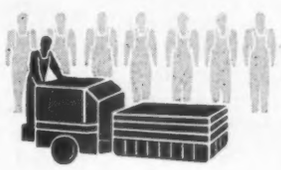
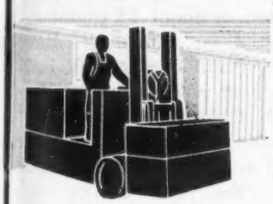


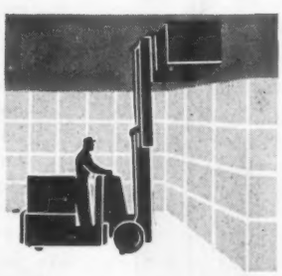
One industrial truck can do the work of 5 to 7 men . . . quicker, safer and with minimum re-handling.

Faster Loading and Unloading of Cars:



By handling your materials in unit loads, industrial trucks can load or unload cars and trucks in a fraction of the time required by manual handling.

Greater Utilization of Storage:



With industrial trucks you stack to ceiling heights . . . doubling storage area without increasing floor space. Taking of inventory is simplified, and damage from vermin minimized.

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Materials are transported right to the worker's machine — finished materials transported to storage. The whole cycle completed with minimum rehandling.

Greater Safety:

to men and materials. Reduces product damage to the minimum.

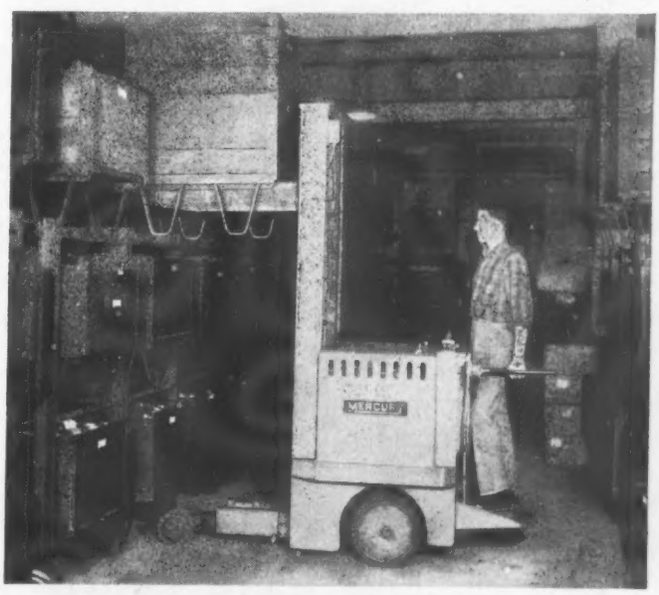
Miscellaneous Handling:

You'll find many additional cost-saving uses for your trucks — delivery of tools to workers ... transporting dies and moulds to and from machines . . . scrap disposal, etc.

And if You Are Moving Materials 200 Feet or More . . .

you can realize additional saving with the Fork Truck-"Trackless Train" System. In the system the fork truck is used for handling and stacking, "The Trackless Train" for the transporting job. A further saving in manpower—time—and equipment.

For complete details ask a Mercury Engineer to call — or write for Bulletin 7-II.



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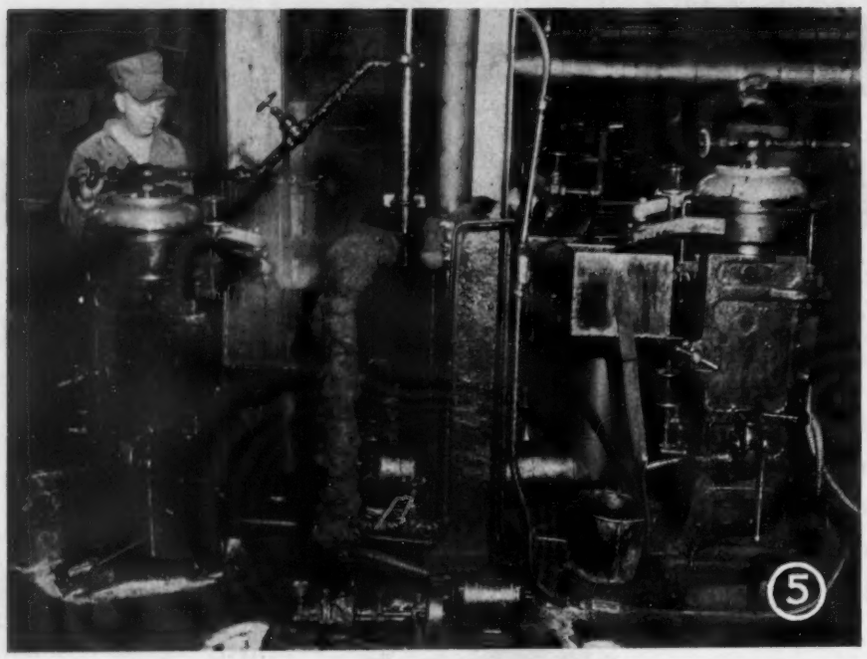


Fig. 5—Two high-speed centrifuge machines which serve 17 tinning machines. Each unit removes from 30 to 40 pounds of impurities per 8-hour run

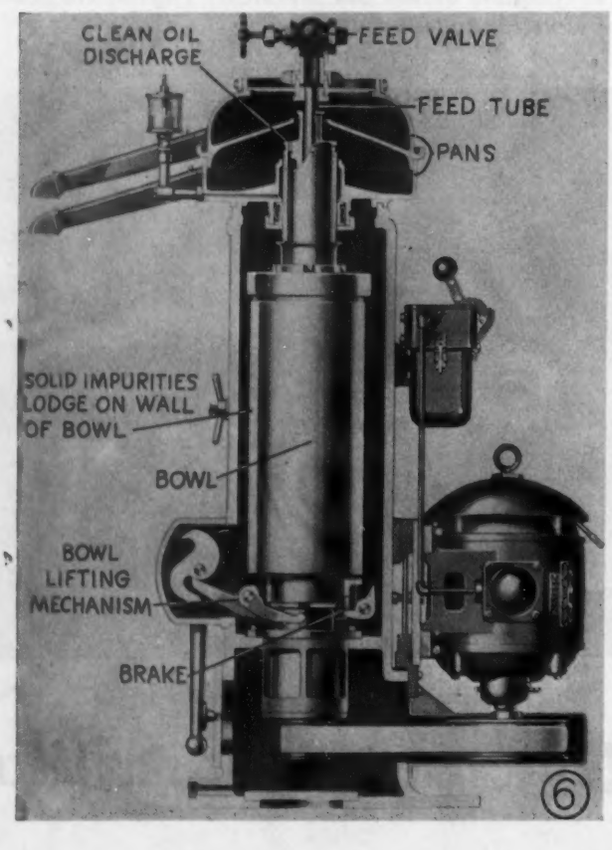
Palm Oil Recovery

(*Continued from Page* 91)

pots was added gradually to the system until two centrifuges now service the 17 pots in the same circulating system for temperature control, and the portable machine is maintained as an emergency stand-by for peak loads. (Fig. 5). Fig. 6 shows details of the centrifuges.

Palm oil as shown in Fig. 1 overflows from its compartment (3) into a gutter (4) extending the full width of the pot, and thence to a receiving tank (5) located below floor level. From here it is pumped into a sludge and cooling tank (7), and from thence into the centrifuging machines (8). Following the centrifugal treatment, the clarified palm oil is pumped to an elevated storage tank (9) and from here is returned by gravity to the center of the tinning machine and distributed uniformly across the width of the tin bath as required by means of a manifold (10). This return flow is automatically controlled to maintain a correct and uniform temperature of the palm oil bath.

Palm oil enters the bowl of the centrifuge through a feed tube attached to the top pan cover and is led to the bottom of the bowl through the center tube, to be thrown outward by centrifugal force and moved upward by more palm oil entering the bowl. As the oil works upward, solid matter is deposited and held against the inner walls of the bowl, and the centrifuged oil passes through the throat of the bowl into the discharge pan.



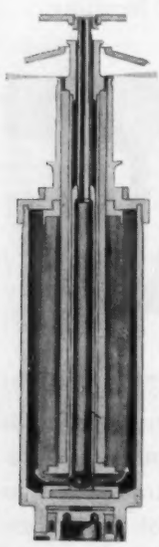


Fig. 6—Basic design and construction features of centrifuge machine. Sectional view of bowl is shown at right

Cleaning the centrifuge is an easy matter. After shutting off the feed and power, the machine is stopped by an externally operated brake which avoids the necessity of waiting for the bowl to coast to a stop. The operators first remove the top pans, then with the bowl lifting mechanism raise the bowl assembly from the drive spindle. The bowl assembly then is swung out, the door locked in the open position, the bowl cover removed and the inner bowl lifted out.

The bulk of the residue is removed from the bowl by a special cleaning auger. After wiping various parts of the bowl, it is reassembled on the door, returned to the drive spindle, and the pans replaced. The bowl as an assembled unit never has to be lifted; nor is there a wait for the machine to cool when hot oil is handled. Under normal conditions the entire cleaning operation can be completed in about 15 minutes.

Two National Acme centrifuges have clarified the oil from 17 tin pots in a day-in and day-out production for several years with the following results:

1. Tin Recovery: Each centrifuge removes 30 to 40 pounds of solid matter from the palm oil in each 8-hour run. This amounts to 400 cubic inches or more of solids which the centrifuge can accumulate in its bowl before cleaning is required. Thus each bowl requires cleaning only once in each 8-hour shift. The bowl cake has salvage value. A large proportion of it is made up of tin salts and compounds which amount to approximately 27 per cent of the total when reduced to pure tin. In addition to the tin recovery, the organic material can be refined further to form dye mordants and other valuable products. All of this material was formerly wasted so far as the tin mill was concerned. Its value more than offsets the cost of operation and maintenance of the revised circulating oil system.

2. Life of Tinning Rolls Increased: Considerably less "bran polishing" is required because of the greatly improved condition in which the tin plate emerges from the machine since the protective layer of palm oil above the molten tin bath has been made clean by centrifuging. Because of the elimination of gritty material

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THE WHEELS OF INDUSTRY

from the palm oil bath by centrifuging, it is now possible and practical to operate the drive mechanism of the tin machine more efficiently and with less maintenance by submerging it in the oil bath. This arrangement increases the life of the tin machine, reduces maintenance and improves efficiency. The rolls now require noticeably less frequent redressing than they did when using uncentrifuged oil.

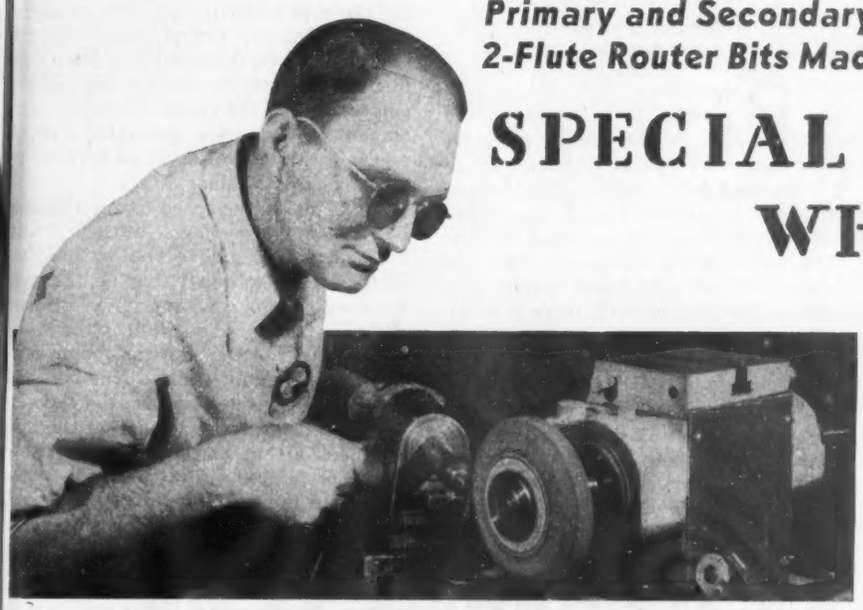
3. Conservation of Palm Oil: With the continuous operation of the centrifuges in the centralized system, it is unnecessary to discard as much palm oil as before because the quality of the oil is maintained at a higher level. This is evidenced by the fact that purchases of new oil have been reduced more than 25 per cent. The high efficiency of the oil from the system is maintained constantly at the level formerly observed only when a complete filling of new oil has been made.

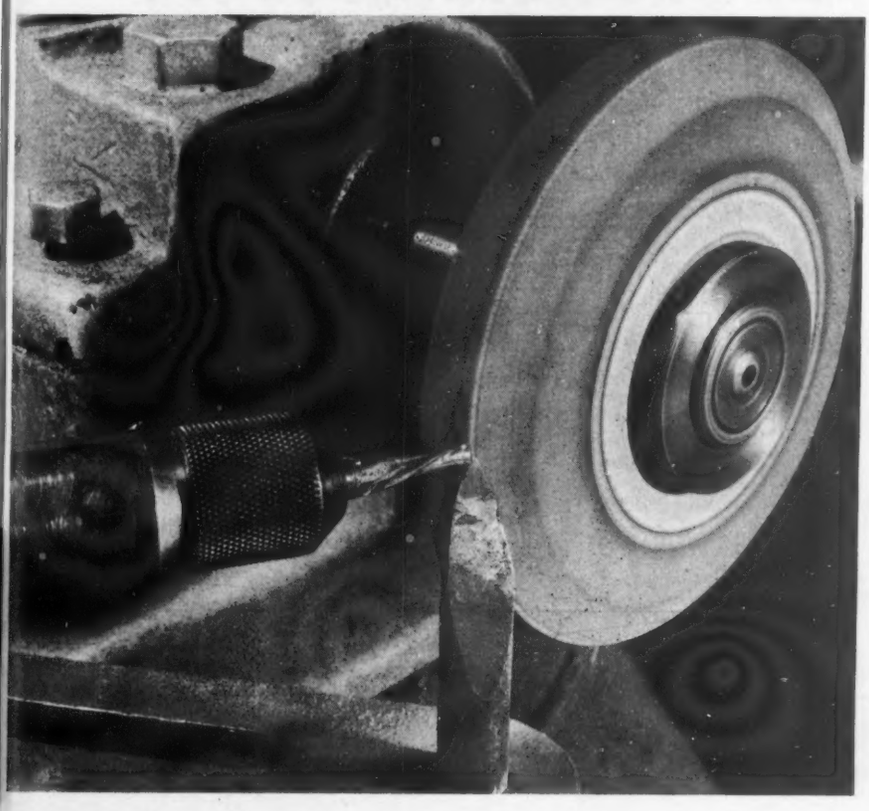
4. Improves Quality: The continuous and flawless coating is accompanied by a lighter application of tin. The quality of tin plate was so good as to cause favorable comment by customers and even investigation to discover the cause. One customer's inspector asked what had become of the "fish eyes" and other flaws that used to appear on the tin plate. The operator pointed to the barrel of bowl cake removed from the centrifuge and said, "They are in this barrel."

Conclusion: Installation of the centrifuges in the continuous palm oil system in the tin house of the Weirton Steel Co. has increased the quality of the tin plate, and conserved palm oil, tin, processing time and labor.

Primary and Secondary Clearance of 1 And 2-Flute Router Bits Made in One Operation on

SPECIAL GRINDING WHEEL





ROUTER bits last longer and break less frequently when restored to cutting condition on a special grinding wheel originated by Raymond A. Marvel of the Army Division Tool Crib at Glenn L. Martin Co., Baltimore. Shown in accompanying illustrations, the tool grinds both primary and secondary clearance of 1 and 2-flute router bits in one operation. In addition to being ground in from one-half to one-third the time previously required, there is far less tendency for the metal to become caked up on the router.

Grinding wheel was made from a worn out standard 6-inch wheel. A 1-inch, 30-degree bevel was turned off from the center line of the grinding head. Top 1/64-inch of bevel nearest work was left to be done flat, and a contour was dressed into the remainder of the beveled surface.

"Finger" Determines Clearance

In use, a finger attachment is placed against the 1/64-inch flat surface to positively set the clearance desired. Work then is passed over the finger once, with the flat surface cutting primary clearance and the contour surface leaving the secondary clearance smooth and symmetrical. Secondary clearance can be controlled by the degree to which the contour is dressed.

Prior to the development of the new wheel, it was necessary to grind the primary and secondary clearances in separate operations, with an output of 110 bits per 9-hour day as against nearly 300 with the present method.

"HYBRIDIZED" Motors

Provide definite advantages in many applications such as dividing conveyor drive load in suitable ratio between two pulleys. Method for holding constant load on induction motor opens up many possibilities

By WARD J. HEACOCK
Electrical Engineer
Link Belt Co.
Chicago

HYBRIDIZING of electric motor characteristics has been applied to many cases of dual motor drives with considerable success. These include dual motor drives for conveyors, drives for a caterpillar-mounted land dredge, the case of a flywheel employed to take peak power demands, etc.

The term "hybridizing" is not used here in the genetic sense. The definition "to cross" is taken literally, for in speaking of crossing motor characteristics, that is just what is done to obtain certain advantages.

Upper half of Fig. 1 shows what is meant by "crossing" motor characteristics. If A-B is a portion of the speed torque curve of one motor, and C-D a similar portion of another motor of higher slip characteristic, and if the second motor is geared to give a little higher synchronous speed to its portion of the drive, but is held down to a predetermined speed by the first motor; then, their characteristic speed torque curves cross. In the case of dual motor drives for belt conveyors this has been very successful.

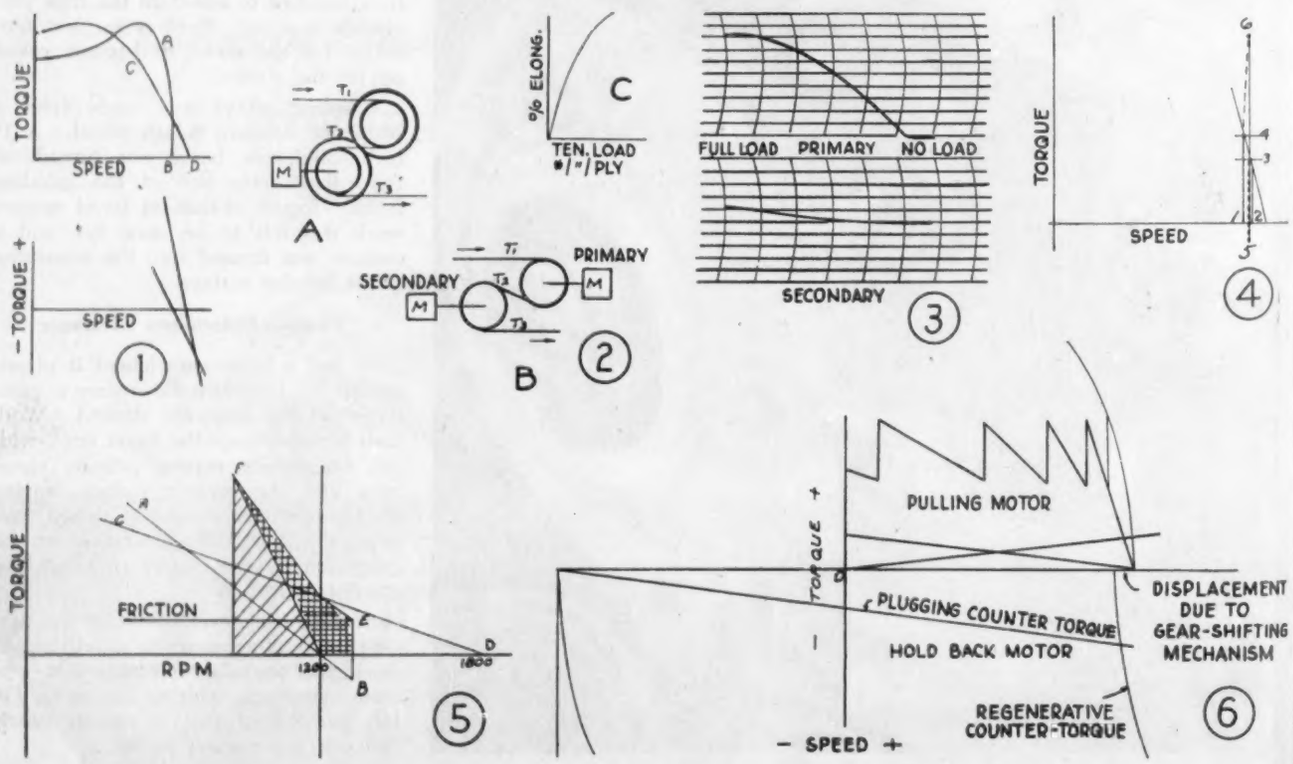
Occasionally, in designing a drive for a conveyor, it is found desirable to divide the load in a suitable ratio between two driving pulleys. Fig. 2 shows two such drives. A is the so-called tandem drive, and B is the dual motor drive. Because a belt conveyor has a stretch characteristic, as shown at C, there is a difference in speed in the belt as at T2 and T1. This difference in speed also varies with a change in load on the belt. Therefore, for a tandem drive as in A, there is only one condition of load for which the drive can be properly designed. However, with the dual motor drive as shown at B, the secondary motor will change its speed automatically to accommodate the changing speed of the belt at T2 as the load changes. Furthermore, the tension of the belt at T2 can be controlled and held to within very close limits, depending on the type of motor used for the primary pulley and on the angle at which the two characteristic curves cross; and, of course, in the amount of stretch in the belt.

In terms of alternating current motors, the primary driving motors may be synchronous, slip-ring or squirrel cage. It is desirable that the secondary motor be of the slip ring type, so that initially the load may be readily adjusted, after which no further adjustment will be necessary.

Fig. 3 shows a reproduction of graphic charts taken on a dual motor drive. The primary motor was synchronous, the secondary a slip-ring type. Note the almost constant load on the secondary motor from no load to full load on the belt. Note also that the synchronous motor shows a negative load at no load on the belt. This results from the synchronous motor holding the slip-ring motor to very definite speed limits—therefore, torque limits. In this case, the torque delivered is greater than that required by the friction load of the empty belt, so the excess drives the synchronous motor as a generator and no power is wasted. Also, T2 is kept at an almost constant value.

Fig. 4 shows the speed torque relations between the two motors, tests on which are shown in Fig. 3. The vertical line is the speed torque curve of the synchronous motor driving the primary pulley. The line crossing it is the speed torque curve of the slip ring motor driving the secondary pulley. Numbers 3-4 indicate the torque limits on the slip ring motor; 5-6 the torque limits on the synchronous motor, and 1-2 are the speed limits of the slip ring motor. 1-2 also represent the belt stretch. Under full load the belt at T-2 is running slower at T2 than at T1, but under no load the

Paper presented at Materials Handling Machinery Manufacturer's Conference, held at Westinghouse Electric Co.



WHEN FIRES GET TOUGH KIDDE EQUIPMENT GETS TOUGHER!

WHEN tough fires spring up—the fast-moving ones that break out in flammable liquids (Class B); the hard-to-get-at kind that start in electrical equipment (Class C)—the Kidde portable or hose reel system acts fast to knock them down—and *out*!

Ordinary water-type extinguishers can't control these tough fires. But the Kidde portable shoots out a cloud of carbon dioxide gas, forming a heavy blanket that smothers the flames. Then the dry, inert, non-toxic gas merely evaporates...leaving valuable liquids *uncontaminated*, electrical equipment *undamaged*. This Kidde method is recognized as one of the speediest, cleanest and safest fire-fighters in use today.

It's smart to check on tough fire areas in your own plant. Does the accompanying list of typical hazards suggest places that still need safeguarding? If it does, call in a Kidde representative—you'll find him wise when it comes to fire protection. Drop us a line.

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belt runs faster at T2 than at T1. Tests on this particular drive show the secondary pulley running about ½ revolution per minute slower than the primary under full load, although they were of the same diameter. This represented a little over 1 per cent difference, which agreed with expected value as measured from the belt stretch curve C.

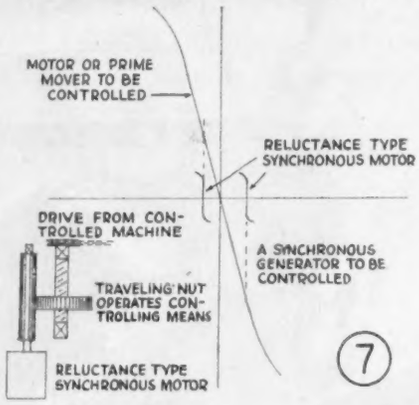
A single motor may be made to accomplish the same results by driving through a reducer on each, and with the secondary reducer having a little less ratio than the primary, with the required slip provided through an hydraulic coupling or eddy-current clutch. It is much more difficult to adjust the hydraulic coupling to handle just the right amount of load than to adjust a slip-ring motor.

A dual motor drive under regenerative braking on a declined belt conveyor is similar to the foregoing except that the secondary motor is geared so that the synchronous speed of its pulley is less than that of the primary pulley. Permanent slip resistance in the secondary motor circuit makes its characteristic curve cross primary motor's curve regenerative side as illustrated, lower half, Fig. 1.

At least one motor of a two-motor drive must be able to adjust its speed. It would be impossible to drive a street car with two synchronous motors.

A dry-land dredge mounted on two sets of caterpillar treads and negotiating irregular ground was driven by two motors geared for the performance represented in upper Fig. 1. Had these been geared for the same speed, irregularities of the ground would have thrown heavy overloads on one motor and its machinery under certain conditions. Crossed curves held overloads to acceptable limits.

Another use for crossing characteristics is illustrated by Fig. 5. In this case a flywheel was employed to take the peak demands for power. Recovery was not rapid enough due to the rapidly diminishing torque of the 1200 revolutions-per-minute motor as it approached synchronous speed. It was undesirable to start the cycle from very much above 1200 revolutions per minute. Two smaller motors, one, A-B, with a synchronous speed of 1200 revolutions per minute, and a second, C-D, with a synchronous speed of 1800 revolutions per minute, combined to give a speed torque characteristic indicated by line E-F. This showed an increased torque delivery as indicated by


MOTOR OR PRIME MOVER TO BE CONTROLLED
RELUCTANCE TYPE SYNCHRONOUS MOTOR
DRIVE FROM CONTROLLED MACHINE
A SYNCHRONOUS GENERATOR TO BE CONTROLLED
TRAVELING NUT OPERATES CONTROLLING MEANS
RELUCTANCE TYPE SYNCHRONOUS MOTOR
7

the heavily shaded section, at same time limiting speed to point E. This was not tried, but seems to have possibilities.

A very successful barge shifting machine employs all the speed torque characteristics of two slip-ring motors. On the first point of control, in either direction, each motor starts pulling on a very low torque to take the slack out of both cables (Fig. 6). On the second point, the pulling motor is given full power driving the trailing motor backwards on a low plugging counter torque. When the pulling motor attains full speed, a current limit relay automatically reverses the primary connections and shorts the rings on the trailing motor. A gear-shifting mechanism drives the trailing motor above its synchronous speed and regenerative counter torque holds the trailing cable taut. The characteristics of this drive are shown in the diagram.

Method developed for holding a constant load on an induction motor opens up a whole series of applications. The lower left corner of Fig. 7 illustrates in simplified form a control mechanism actuated by a small reluctance-type synchronous motor. This motor, through suitable gearing, provides a reference speed. For example, it may be desirable to deliver a constant weight of air representing a speed of 860 revolutions per minute through a fan from the motor. Gearing between the motor and reference unit is such that the synchronous motor drives the unit at a speed corresponding to 860 revolutions per minute. Any variation from this speed in the threaded shaft will cause the unit to move one way if the speed is low, the other way if the speed is high. The movement transmitted to the gates will correct the opening until just the right amount of air moves to establish equilibrium at 860 revolutions per minute.

This suggests many other applications. For instance, a synchronous generator driven by a water turbine in an unattended station may be set to carry its maximum load and will do so without relays or delicate contact-making meters.

Prime movers of all sorts operating in multiple, such as airplane engines, may be held by this means at exactly the same speed. It should be noted, however, that this cannot be applied where the prime movers are driving alternators that must be synchronized.

Another application is its use as a positive over-speed cut-off for monitor-type lowering machines or other drives employing regenerative braking for lowering. In such cases as these the small synchronous motor must be capable of running continuously at a predetermined speed below its synchronous speed.

Automatic Welders Converted to Manual Type

Alternating-current welding sets producing 1000 amperes for use with automatic machines in fabricating large, thick-plate war equipment now can be converted into machines for manual service should the need for automatic welding decrease, according to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. It is a welder-conversion device with which welder can be converted to serve as a power supply to six individual, manual welding operations with current range of 45 to 270 amperes.

Device consists of a transformer and six reactors which are fed by the welding transformer. Transformer steps normal operating open-circuit voltage down from 85 to 74 volts, which is more suitable for manual welding. Use of transformer increases current capacity of the supply unit. Output of the six reactors is controlled by placing two bayonet plugs in one of 20 possible settings, providing current adjustment over range of 45 to 270 amperes in approximate equal increments of current.

Internally Heated Furnace Features Extreme Depth

An internally heated electric salt bath furnace, designed and built for heat treating in vertical position long broaches and similar work likely to distort when heat treated horizontally, is manufactured by Upton Electric Furnace Division, 7450 Melville, Detroit 17. A feature is furnace's extreme depth compared to its surface area, depth being 81 inches and surface only 9 inches square.

Such proportions have not been previously successfully combined in an internally heated electric salt bath furnace due largely to limitations of the conventional type of electrodes. Electrodes enter through the sides of the furnace and at the bottom of the pot, in contrast with other types requiring approximately 25 per cent of the working area. Thus, with no space required for electrodes in working area of the pot itself, pot need be only of sufficiently large surface area to admit the work.

In operation, while a temperature drop of 4 degrees Fahr. (just enough to actuate the "on" and "off" controller) can take place at the bottom of the pot, molten salt at the top of the pot remains at practically constant temperature. When long pieces of cold work are placed in the bath, there is a uniform drop in temperature through the entire bath. Two thermocouples, one at the top and the other at the bottom of the pot, record the temperature and actuate the "on" and "off" controller.

—o—

An 11-page folder, GEA-4220, by General Electric Co., Schenectady, contains information on seam-welder controls, including tables and illustrations.

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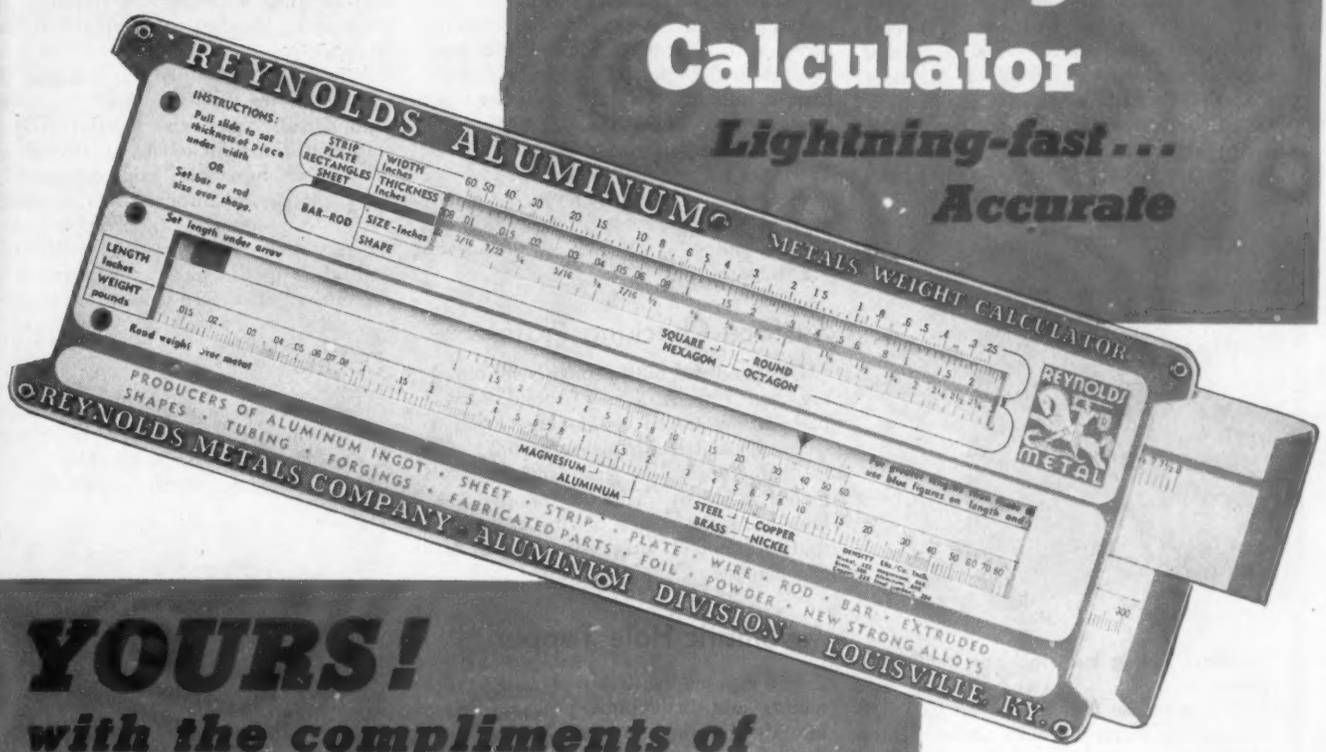

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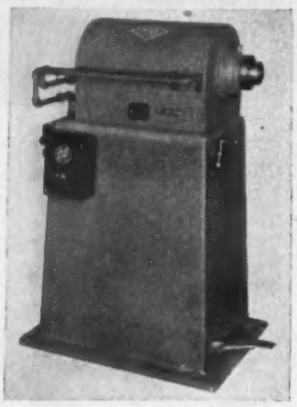
INDUSTRIAL EQUIPMENT

Variable Speed Lathe

Single foot-pedal control of full work cycle is one of the features of the air operated, heavy duty, variable speed lathe introduced by Schauer Machine Co., 2600 Reading road, Cincinnati 2, O. It also features the application of air operation to the work spindle which has a 1-inch clear hole through it, for



handling rod or bar stock, or long work pieces.

This machine will handle up to 1 3/8 inches maximum capacity collet. Step chucks, expanding mandrels, or special work holding fixtures can also be used. The motor operates continuously. Depressing the foot pedal closes collet, releases brake, and connects motor to work spindle through a Twin-Disc clutch assembly. Air line is provided with control valve which permits time lag before collet releases work.

Variations in spindle speeds are obtained through the use of a Reeves drive, with control handle located convenient to the operator. Spindle speeds, from a minimum of 100 revolutions per minute to a maximum of 4800 revolutions per minute (in a ratio of 6:1 or 12:1) can be selected. This speed lathe is designed for performing such secondary finishing operations as polishing, deburring, filing or lapping of metal and plastic parts.

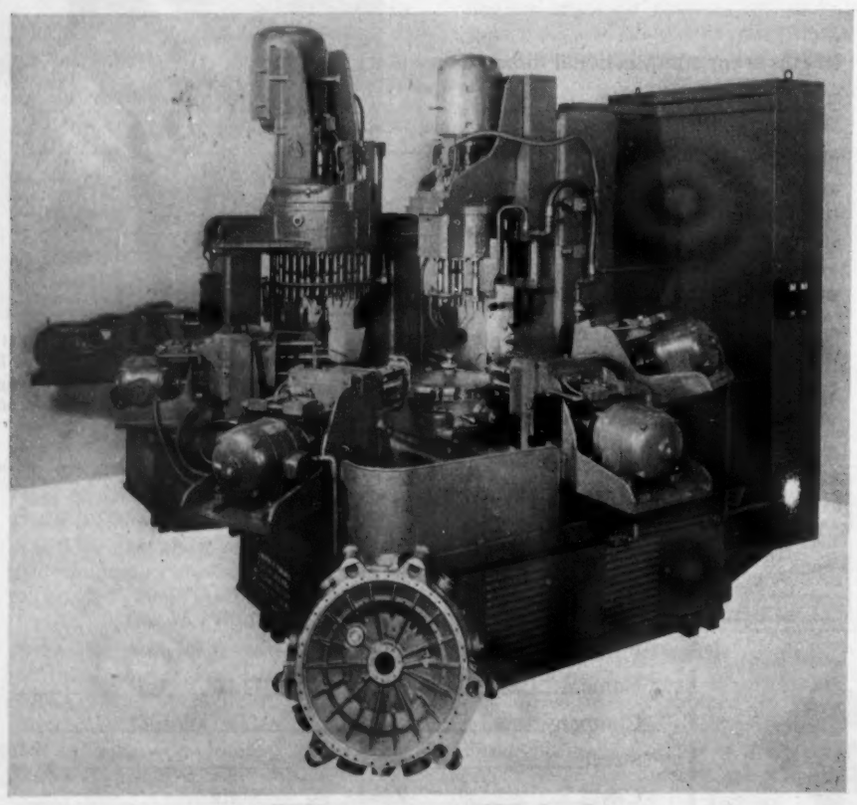
Surface Checking Plate

Designed and built primarily for checking gun turrets, a new round surface plate is announced by Machine Products Corp., Detroit 12. It measures 102 inches in diameter and is approximately 18½ inches in depth. This 2½-ton plate follows the same design of rib construction that is found in other surface plates of this company.

Automatic Hole Tapper

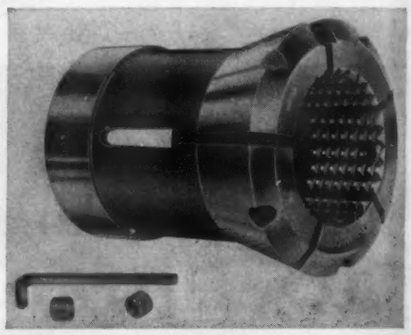
For tapping 61 holes of various diameters and in various positions in an aircraft housing, an automatic cycle, special purpose machine is designed and built by Snyder Tool & Engineering Co., 3400 East Lafayette, Detroit 7. With the part located and clamped in central position on the fixture slide, the starting button sends the slide and part to the left of the operator and under a multiple spindle tapping head. In the same position are several horizontal and angular units with tapping spindles. All the tapping spindles have individual lead screws.

When the left half of the machine has completed its cycle the part is moved automatically past the central loading station to the right where another group of vertical, horizontal and angular tapping spindles go through their operating cycle. A number of these tapping units are installed on hydraulically operated subslides to provide rapid advance of the entire unit before lead screw tapping.



Collets

Incorporated in each serrated section of the new collets offered by Sheffer Collet Co., Traverse City, Mich., is a "cup-point" lug which penetrates the



stock slightly with the collet in the locked position. Lugs are usually set 0.010 to 0.015-inch above regular serrations. They can be adjusted for more or less penetration or can be turned away completely, leaving effective only the standard serrations, all without removing collet from the machine.

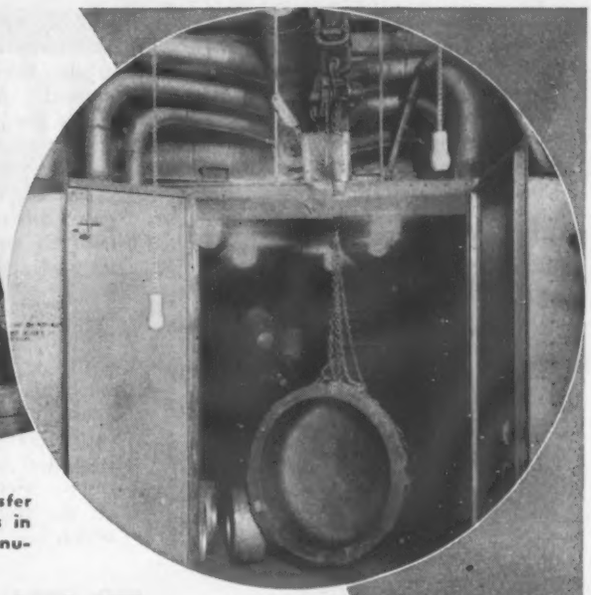
These collets are particularly effective for handling hot-rolled steel and on jobs where heavy tool thrusts cause slippage. It is particularly designed for holding stock sizes of 2 inches and larger.

Tool Holder

A new type flexible tool holder, Tool-Flex, is announced by Richmont Inc., 215 West Seventh street, Los Angeles 14. In place of complicated mechanism, the tool utilizes an oil-resistant neoprene rubber insert as the universal joint in which the tool floats. It is designed as a follow-up tool. It compensates for both parallel and angular misalignment of turret head or tail stock with the lathe spindle. It permits reamer, counterborer or hone to follow and by relieving side pressure, prevents bell-mouthing, oversize holes and tool marks, reduces wear on tool and jig bushings; produces more accurate close tolerance work. Tightening or loosening the retainer cap increases or decreases the counteraction of the rubber insert to com-

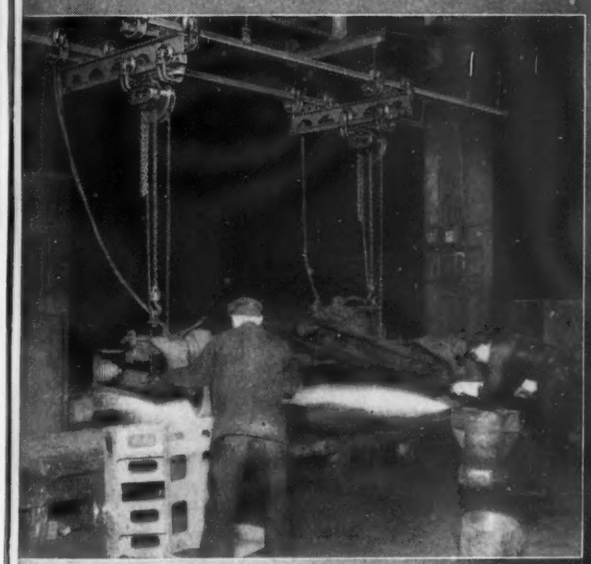
(All claims are those of the manufacturer of the equipment being described.)

Hand-propelled transfer bridges with electric hoists in Cleaning Department of large lathe manufacturer.



Heavy castings are carried into chamber and supported on overhead tramrail during blast cleaning.

OVERHEAD EQUIPMENT *Operates Smoothly in* Abrasive Plants

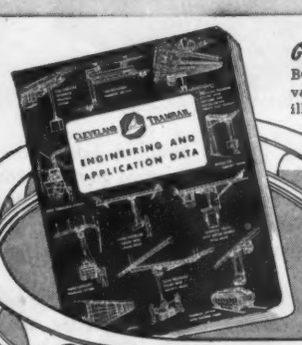


Hundreds of short-span Cleveland Tramrail cranes are handling swing grinders in many plants.

In the cleaning departments where castings, forgings, billets, etc., are ground and blasted, will be found convincing proof of the design, workmanship and quality built into every piece of Cleveland Tramrail equipment. Here also is demonstrated the inherent correctness of locating materials handling facilities above and away from the floor where dust conditions are worst.

Despite blasting, piercing storms of grit, and atmospheres churning with penetrating abrasive dust, the equipment continues smooth and easy in operation — even after years of continuous service.

Dozens of Cleveland Tramrail installations are serving successfully the tough cleaning jobs of industry.



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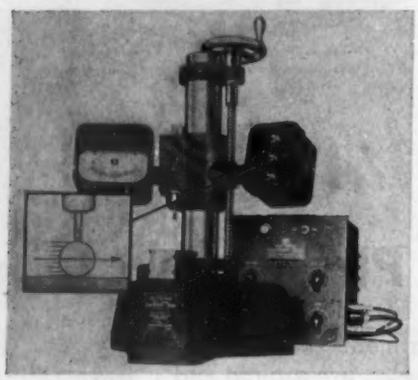
CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

pensate for varying degrees of misalignment or character of work.

The tool holders are made for both large and small lathes with turret heads, engine lathes, drill presses, tappers and ¼ and ½-inch portable drills. Chuck arbors, reamer holders and Morse taper sleeves are interchangeable in any style body of the same size. All metal parts are made of alloy steel, hardened and ground where needed.

Electronic Inspection Gage

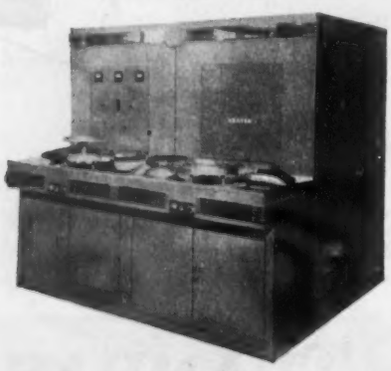
Limit lights in the new Model 130 electronic gage show immediately any variation in specified dimension. No maximum and minimum masters are required to set dimension limits. The unit also features a wide range zero adjustment which makes setup faster



and more positive. Contact pressure is adjustable from 2 to 16 ounces. Four magnifications enable readings from 10 microinches to 0.003-inch. This gage is manufactured by Federal Products Corp., 1144 Eddy street, Providence 1, R. I.

Electronic Heater

For surface and localized hardening of gears, rods, and other parts and for annealing, brazing and soldering operations, a new 50 kilowatt electronic heater is announced by Industrial Heating Division, General Electric Co., Schenectady, N. Y. Recommended for use in



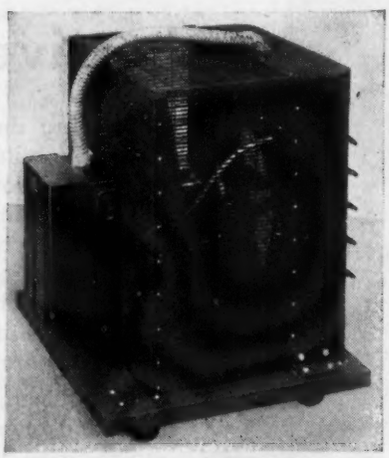
metalworking plants, the heater incorporates all the important features of the 5 and 15 kilowatt heaters made by the company and is capable of heat treating larger parts or the same size parts in less time.

It is available in models rated either 230 or 460 volts, 3 phase, 60 cycles. The parts to be heated are positioned in the fixture and the start button is pressed. Automatic controls then regulate the heating and quenching cycles. An attached work table provides two heating positions.

The electronic heater cabinet is composed of two compartments, one contains an air cooled transformer to step-up power supply voltage to the six rectifier tubes and such accessory items as a contactor, a tap changing switch and filament transformers; the other compartment contains the high frequency components—a single water-cooled oscillator tube and a bank of water-cooled capacitors. The two compartments are separated by a heavy, protecting partition. Meters and controls are mounted on the front of the two compartments which are bolted together.

Portable Air Heaters

For supplying heat for a short period of time or where extra heat is required, Electric Air Heater Co., Mishawaka, Ind., announces new portable model heaters. These heaters were designed originally



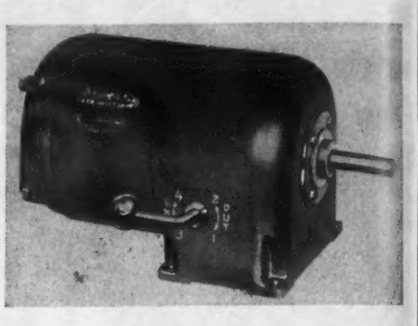
for the heating of emergency huts used to protect men working outdoors at a steel plant. Heater elements, fan motor, contactor and switch are mounted on one base provided with casters for mobility.

Gearshift Drive

Lima Electric Motor Co., 3701 Findlay road, Lima, O., announces a new light duty, selective four speed gearshift drive. The unit is designed to power machine tools and other equipment requiring motor capacities of 1 horsepower or less. The unit is rated at 1/2 and 3/4 horsepower at 1200 revolutions per minute and 1 horsepower at 1800 revolutions per minute. It has an overall length of 18 inches including the shaft extension; the width, including terminal box and shifting lever is 12 inches, while height is 9 inches.

The unit, identified as tye R, is designed for continuous operation, with ample overload capacity. A semi-enclosed, drip-proof, ball bearing motor of either 2 or 3 phase, 50 or 60 cycle, 220, 440, or 550 volts is furnished as a standard integral part of this unit. It is reversible in all speeds with the use of a reversing drum control.

Equipped with antifriction bearings



throughout, the shaft and all gears are of heat treated alloy steel, running in a bath of oil.

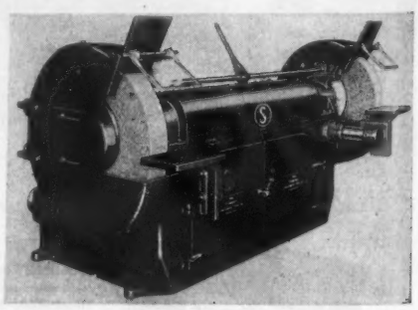
Coolant Pump

Ruthman Machinery Co., Cincinnati, O., has designed a new gusher deep immersion type coolant pump. It is available in two lengths, 19 and 23 inches immersion below high level line of coolant reservoir. The mounting bracket is a circular flange type 10½ inches in diameter.

The entire rotating assembly is on a 1-piece extended steel shaft, electronically balanced after assembly, and mounted in the motor on precision ball bearings. It is available with ¼-horsepower motor for continuous duty and ½-horsepower motor for extra heavy duty, in standard current characteristics.

Snagging Grinder

Designated as No. 75, a new heavy duty double end snagging grinder is offered by Standard Electrical Tool Co., 2504 River road, Cincinnati 4, O. There are four speeds of 1200, 1375, 1675 and 1950 revolutions per minute to maintain 9500 square feet per minute on the

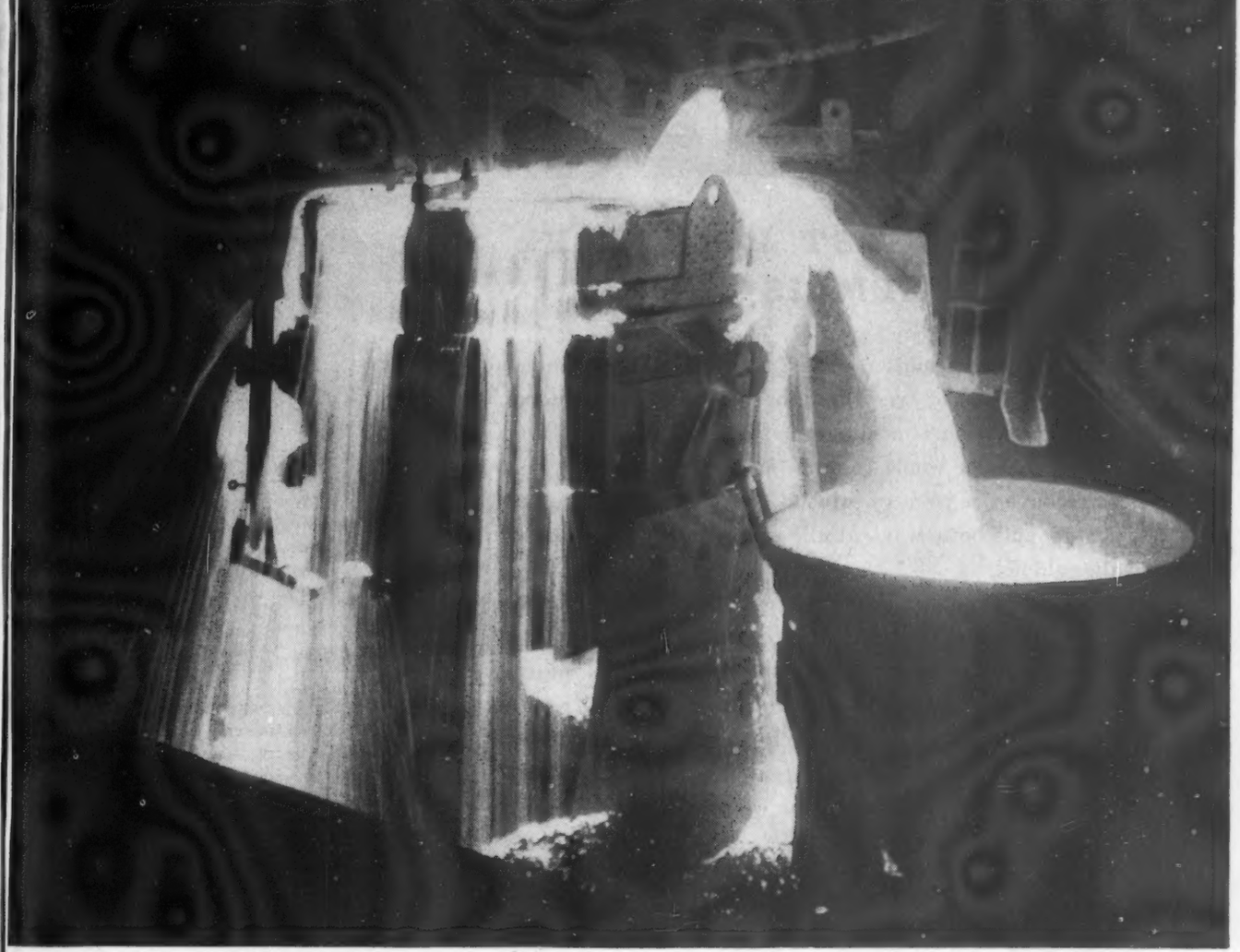


two 30 x 5 inch resinoid bond wheels. Interlocking speed control prevents overspeeding of the wheels. Power is transmitted through multiple V-belt drive. It has shaft coupling for renewal of V-belts.

The 30 horsepower ball bearing motor is adjusted by integral ratchet wrench for placing tension on the V-belt drive. The boiler plate steel guards are adjusted to wheel wear through rack and pinion

SULPHITE-TREATED STEEL

Is Steel That's Had a "Bath"



• Sulphite-Treated Steel has had a "bath." Silica and Alumina, present in steel, are abrasive impurities which Sulphite-Treatment removes.

This cleansing process produces a steel that permits greater machine speeds and assures longer tool life. Its uniform physical properties reduce rejections and provide a better finished product. Sulphite-Treatment lends itself particularly well to alloy and special steels of high carbon content.

Investigate the possibilities of using steel treated by this process. Our sales and metallurgical staffs are ready to show you how Sulphite-Treated Steel will give you uniformly excellent results.

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WISCONSIN STEEL

OUR BIGGEST POSTWAR PROBLEM IS JOBS!

Our Armed Forces must continue to push for the uninterrupted production of everything they need for total Victory.

But reconversion is coming—and it will take time. You can't reconvert a whole country on a Thursday and you can't reconvert a country when Government Agencies are trying to pull both ways at the same time with industry in the middle.

The time has come when war needs should be completely reviewed and every effort made to get materials into the hands of *some* manufacturers for the resumption of peacetime production. Otherwise, serious unemployment will result.

Right now Industry, with the help and backing of Government Agencies, should begin to put its postwar plans into effect—in so far as it can be done without interfering with war requirements.

The call for JOBS is a call for CO-OPERATION—between the Armed Forces, the Government Agencies, Labor and Management—CO-OPERATION such as we've never before witnessed in this country.

Geo. D. Trundle Jr.
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Graybar Bldg., 420 Lexington Ave.

movement by a built-in ratchet wrench.

Equipment includes adjustable spark breakers, eye shield and the heavy duty work rests measure 6 x 11 inches. Wheel flanges are 15 inches in diameter for 12-inch bore wheels. Overall spindle length is 92 inches with spindle height of 33½ inches. The base measures 42 x 75 inches.

Vertical Bar Shears

With ram pressures from 25 to 300 tons, a new line of open-end vertical bar shears designed in ten sizes is introduced by Thomas Machine Mfg. Co., Pittsburgh

23. Shearing capacities for rounds range from 1 to 3 inches. The open-end feature enables more accurate handling and makes the shear blades easy to see and change.

The new shears are adaptable for punching and plate and angle shearing. The ram is machined for attaching various types of punching tool arrangements including single, double or triple gagged units, cluster punches or floating punch. Frames of the new machines are constructed of rolled steel plate with steel throat section welded into place. The multiple jaw type clutch has a positive automatic kickout for stopping ram at top of stroke. Flywheel is mounted in roller bearings, located within frame for safety and to eliminate overhung load on bearings. It is operated by a V-belt motor drive.

Gas Purifier

Utilizing metal palladium as a catalyst that operates at room temperature, a newly developed gas purifier is announced by Baker & Co. Inc., Newark, N. J. Designated as Deoxo gas purifier, it removes oxygen from such gases as hydrogen, nitrogen, argon and neon. Gases of extremely high purity, that is with less than 20 parts of impurity in a million are obtainable. It is recommended for use in the manufacture of radio and radar

WITH

Brad Foote Gears

RATIOS	
HERRINGBONE	2:1 to 295:1
WORM	3⅝:1 to 60:1
GYRO	16:1 to 30,000:1
SPUR	2:1 to 40:1
VERTICAL HELICAL	2:1 to 80:1
SPIRAL BEVEL	1:1 to 5:1
PLANETARY	4:1 to 400:1
OIL WELL UNITS	12:1
LITTLE GIANT	28:1

Brad Foote precision cut gears are made in our ultra modern plant from any practical material in all practical sizes, (spur gears may be cut in diameters up to 108 inches) in any quantity, large or small.

Trained personnel—extensive shop equipment necessary to do all types of special precision gears—large plant capacity assure the prospective buyer maximum results and production in amounts of any proportion.

ARMY E NAVY

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WE CAN DELIVER a limited number of 5 to 10 ton cranes in 60 to 90 days

This type of Euclid Crane is ideal for many industries.

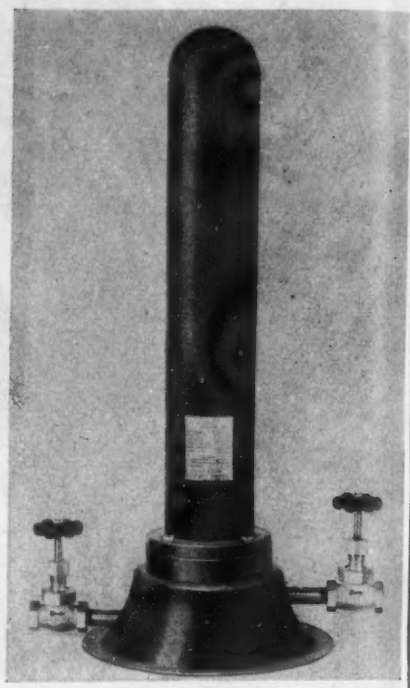
Convenient floor controls permit it to be operated skillfully by any of the several men working on the floor. They get the necessary "lift" instantly whether it be a speedy movement of material, or the precision of control required in modern foundry work, the placing of parts in machine tools, or the final assembly of finished parts. This saves valuable time and increases the output of each man-hour.

Euclid Cranes and Hoists don't have to be pampered. They embody safeguards against all contingencies and are as nearly "fool-proof" as it is possible to build. Above all they are products of quality that prove to be the cheapest to operate and maintain in the long run.

THE EUCLID CRANE & HOIST CO.
1365 CHARDON RD. · EUCLID, OHIO

tubes, as well as in heat treatment of alloys, powder metallurgy and in all research laboratories using pure gases.

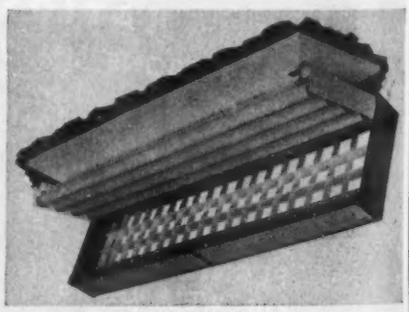
The unit is available in two sizes. Both are compact, containing the catalyst encased in metal cylinders provided with intake and outlet valves through which the gas is passed. One, standing 20 inches high with a capacity of 200 cubic feet of



gas per hour, is designed for laboratory and limited production use. The other, for general plant operation, measures 40 inches high and is constructed for wall mounting. Its capacity is 1000 cubic feet per hour. Both units will handle pressures up to 50 pounds per square inch.

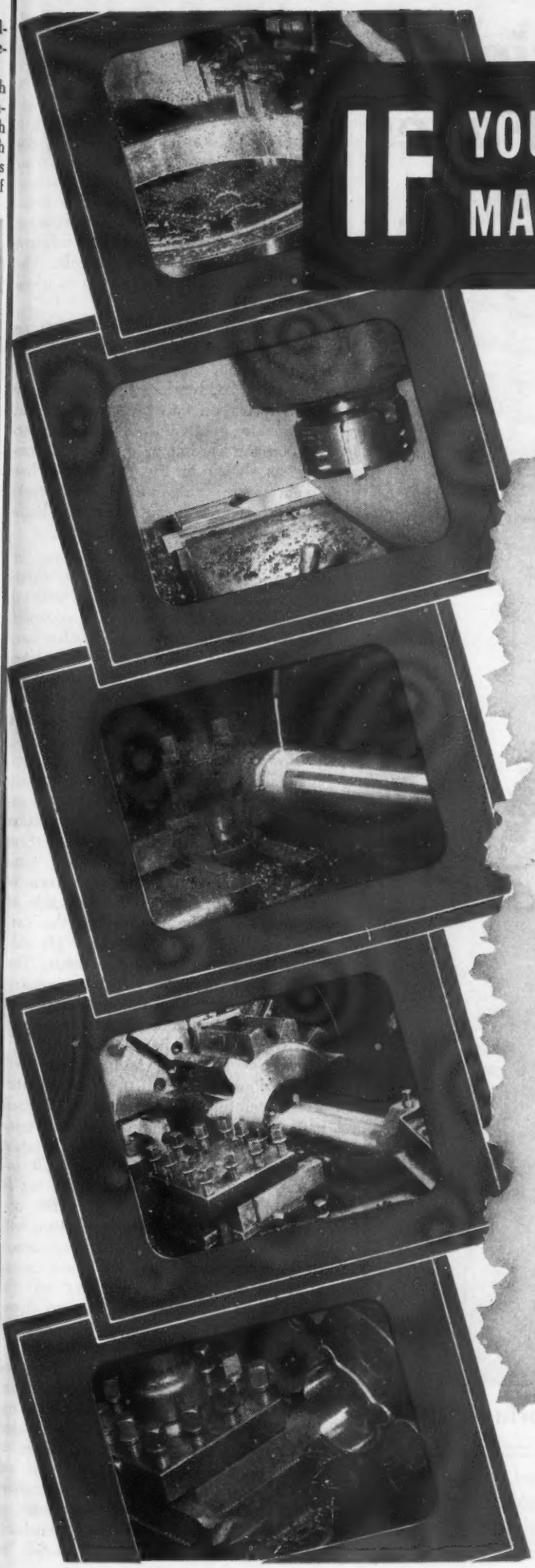
Lighting Fixture

A new type of fluorescent lighting fixture equipped with the E-Z servicer is offered by R. & W. Wiley Inc., Dearborn and Bridge streets, Buffalo 7, N. Y. The fixture is hinged so that one man



can open it for cleaning or changing tubes. No tools are required.

The fixture is made in four models including both ribbed glass glare shield and louvered types, industrial and commercial designs with two, three, and four tubes and starter or instant type ballast. It can be installed either in single ceiling fixture or in continuous runs.



IF YOUR BUSINESS IS MACHINING *STEEL*

THE EXPERIENCE OF AMERICA'S SHELL-MAKERS IS SIGNIFICANT

SHELL-MAKERS USING KENNAMETAL GET UP TO 6 TIMES THE OUTPUT PER UNIT OF CEMENTED CARBIDE CONSUMED

Recent official reports regarding the national consumption of cemented carbides on tools used for machining 105 mm shells disclose the following significant facts:

Where carbides other than Kennametal are used, the average consumption per shell produced has been about 3 calculated grams.

Four large manufacturers who use Kennametal for 50% to 100% of their tools, consume on the average, only ¾ of a gram of carbide per shell.

Three plants using Kennametal exclusively, average less than ½ gram per shell.

In the current huge shell-producing program Kennametal is being used successfully on all the large sizes for roughing, finishing, facing, cutting off, grooving, and chamfering, as well as for de-burring of band grooves with a distinctive lathe file.

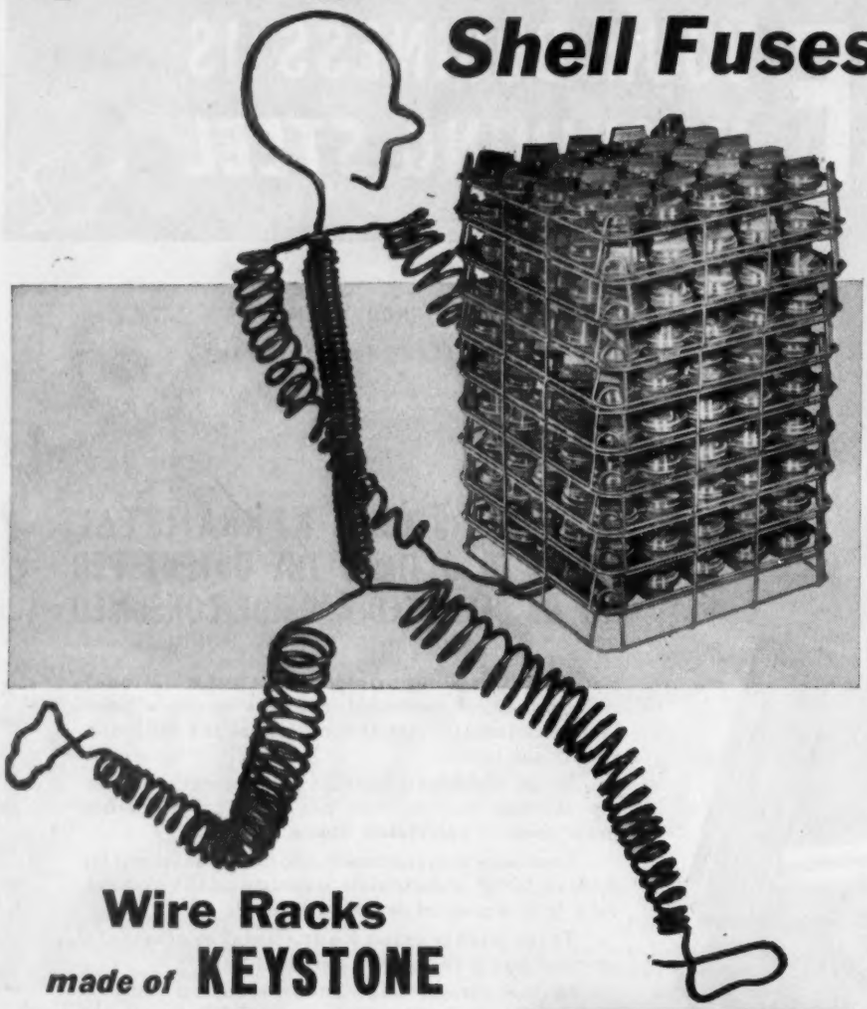
The properties of Kennametal that produce such notable results for shell makers are equally valuable to any company in the business of machining steel. Even the toughest alloys, and those having a hardness up to 550 Brinell, can be readily machined at economy-promoting speeds, and with unusually long tool life.

The effective constituent of steel-cutting Kennametal is tungsten-titanium-carbide ($WTiC_2$), which distinguishes it from all other cemented carbides, and is a major reason for its outstanding success.

Kennametal field engineers are fully experienced in the application of cemented carbide tools. They will be glad to help you on any steel machining problem.

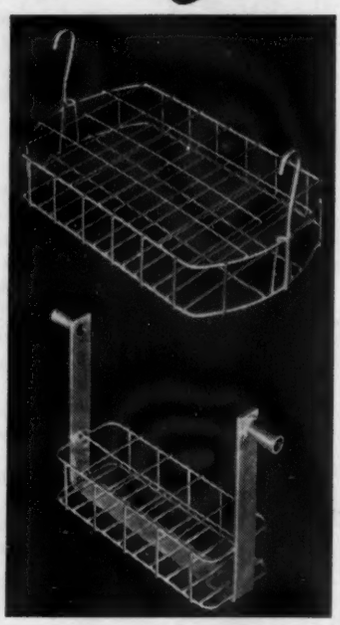
KENNAMETAL
SUPERIOR CEMENTED CARBIDES
KENNAMETAL Inc., LATROBE, PA.

Speeding Production of Shell Fuses



Wire Racks made of KEYSTONE Wire

More than *half a million* wire racks made by *Commercial Platers Company are now being used in war plants . . . helping speed assembly line production of shell fuses, airplane parts, and shot ammunition. These racks are made of Keystone wire . . . again proving the versatility and adaptability of Keystone's wire mill production. We are indeed proud that Keystone wire is privileged to serve in thousands of fighting forms as actual parts of ships, planes, tanks and ammunition, as well as on wartime assembly lines.



*Commercial Platers & Manufacturers, Inc., Rockford, Illinois

KEYSTONE STEEL & WIRE CO., Peoria 7, Illinois

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE

Coppered, Tinned, Annealed, Galvanized

Treating Stainless Steels

(*Continued from Page* 88)

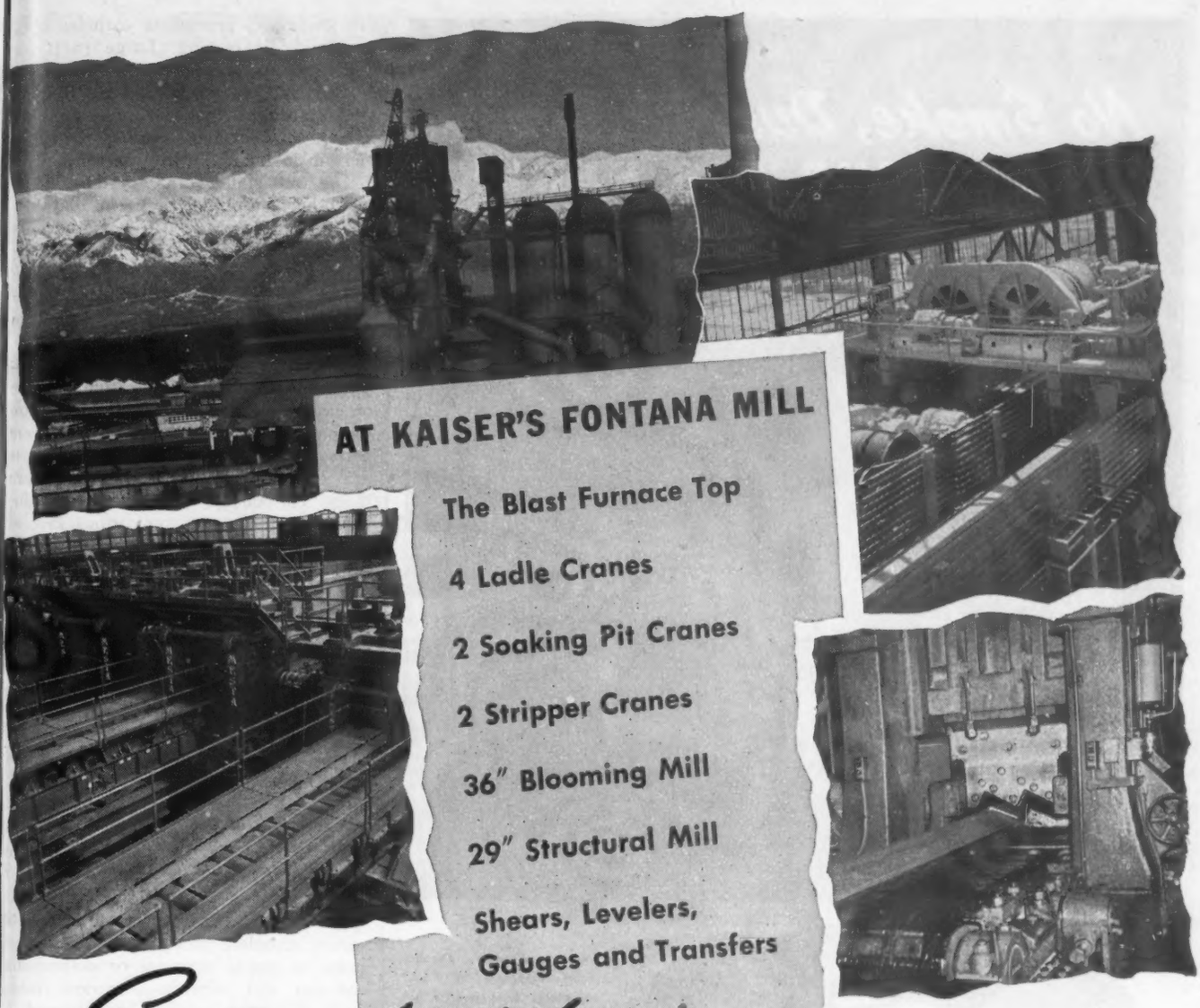
hardening, these alloys cannot be hardened by heat treatment, but they can be appreciably hardened to varying degrees by cold working. They are nonmagnetic unless severely cold worked. When annealed, their structure is composed primarily of the microconstituent austenite, and they are therefore referred to as "austenitic" stainless steels. The chemical analysis of this group is given in Table XII.

Characteristics: Alloys in this group are austenitic and nonmagnetic and cannot be hardened by thermal treatment. They may be hardened, however, by cold deformation and become magnetic. The increase in strength depends primarily upon the chromium and nickel contents, as shown in Fig. 17. Alloys low in chromium and nickel cold-work-harden much more rapidly than those high in chromium and nickel.

The principal reason for annealing the alloys in this group is to obtain maximum softness and ductility by removal of cold working stresses. In addition, annealing is desirable to dissolve any chromium carbides which may have been precipitated during forging or other hot working operations; or when the material has been exposed to temperatures from about 900 to 1650 degrees Fahr., or slowly cooled through this range. Such carbides, when present in the grain boundaries, must be redissolved by reheating above the carbide precipitation range and rapid cooling to hold them in solution. Ranges of annealing temperatures for each grade are given in Table XIII. In general, the low side of the range may be used when the carbon content is low and the high side when the carbon content is high. The hardness of the alloys after annealing depends somewhat on the annealing temperature. Higher annealing temperatures give slightly lower hardnesses.

Time at annealing temperature need not be long. Usually, 10 to 20 minutes at temperature is sufficient for small parts. Larger parts may be held at temperature for 30 minutes. The shortest time consistent with obtaining full solution of carbides and full softening is desirable. Prolonged heating in the upper ranges of annealing temperature will result in some grain growth. Experience shows, however, that for most uses, large grain size has no effect on the ductility or corrosion resistance of these alloys.

Rapid cooling from annealing temperatures is essential to keep the carbides in solution. Very small parts often can be air cooled with satisfactory results, but larger parts must be water quenched. In the long run there is usually nothing to be gained by air cooling, except to minimize distortion in thin sections and water quenching is the safest practice. Water quenching Type 310 is always recommended as



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2 Stripper Cranes

36" Blooming Mill

29" Structural Mill

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SERVICE-PROVED for years on revolving blast furnace tops, overhead cranes, mill stands, tables, and other steel mill equipment of all kinds, Trabon Lubrication makes absolutely certain that every bearing receives just the desired amount of lubricant while the mill is in operation. Individually engineered to your own particular requirements, Trabon Lubrication prolongs bearing life,— avoids breakdowns and production tie-ups,— minimizes accidents and compensation costs,— assures long, efficient, trouble-free operation.

Let Trabon engineers with their long, practical successful experience in steel mill work help you with your next lubricating job.

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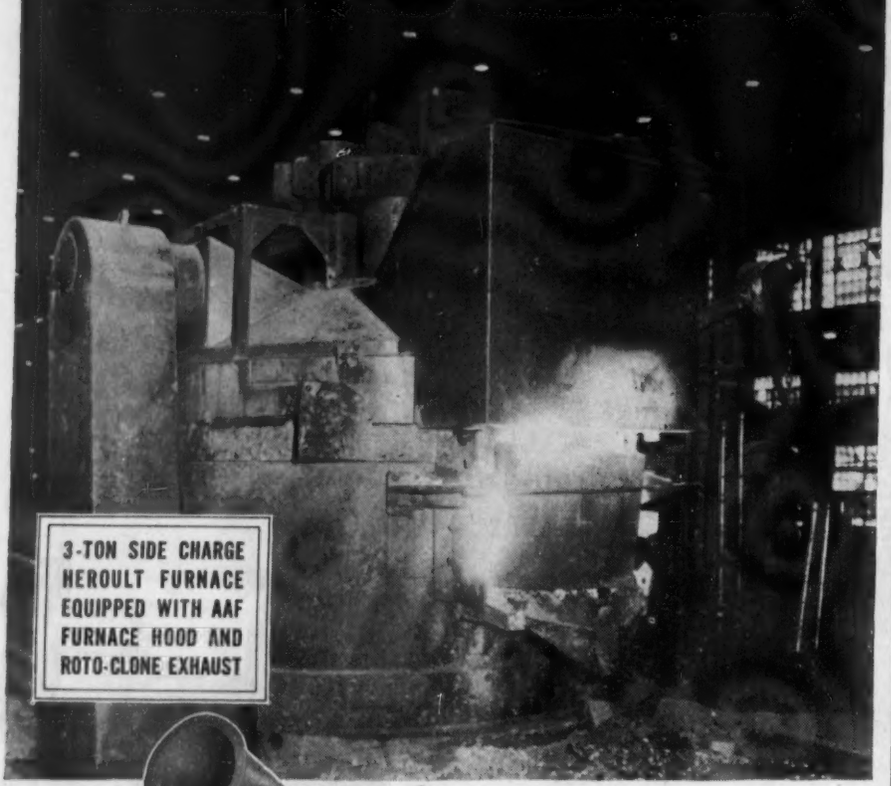
ORIGINATORS AND PATENT OWNERS OF THE SINGLE LINE REVERSING LUBRICATING SYSTEM

No Smoke, Dust or Fumes
CLOUD THE AIR HERE!



Typical Electric Furnace Hood designed by AAF engineers. Each electric furnace requires individual hood designing to conform to both type of furnace and location of Roto-Clone unit used to exhaust smoke and fumes.

THE specially designed AAF Furnace Hood in combination with the Roto-Clone, meets the need for positive and effective control of smoke and fumes from electric melting furnaces. Positive performance is assured with a surprisingly low exhaust volume, regardless of atmospheric conditions or location of furnace. Hood designs have been perfected for both side charge and top charge furnaces. The Roto-Clone maintains the necessary indraft through the hood to prevent smoke, fume and dust dispersion during the melt down, molten metal, boiling and refining stages. Send for descriptive Bulletin No. 278. It's full of helpful information.

AMERICAN AIR FILTER COMPANY, INC.
443 Central Avenue, Louisville 8, Kentucky
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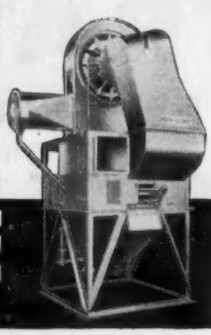


ROTO-CLONE
FOR FOUNDRY DUST CONTROL

this grade will precipitate carbides even on rapid air cooling. Large parts, or heavy loads, should be quenched as quickly as possible after removal from the furnace so that they do not cool below 1650 degrees Fahr. before immersion in the quenching bath.

The 321 and 347 Types differ from the other austenitic alloys in that elements have been added to combine with the carbon and thereby to minimize the possibility of the formation of chromium carbides. The combining of titanium or columbium with carbon is referred to as "stabilization."

These alloys are recommended for applications involving fabrication by arc or gas welding and where the parts are to be subsequently exposed to severe corrosion conditions, or where the parts are operating within the temperature range of 900 to 1650 degrees Fahr. However, for many applications involving welding and subsequent exposure to mild corrosive conditions, Type 304, will prove entirely satisfactory.

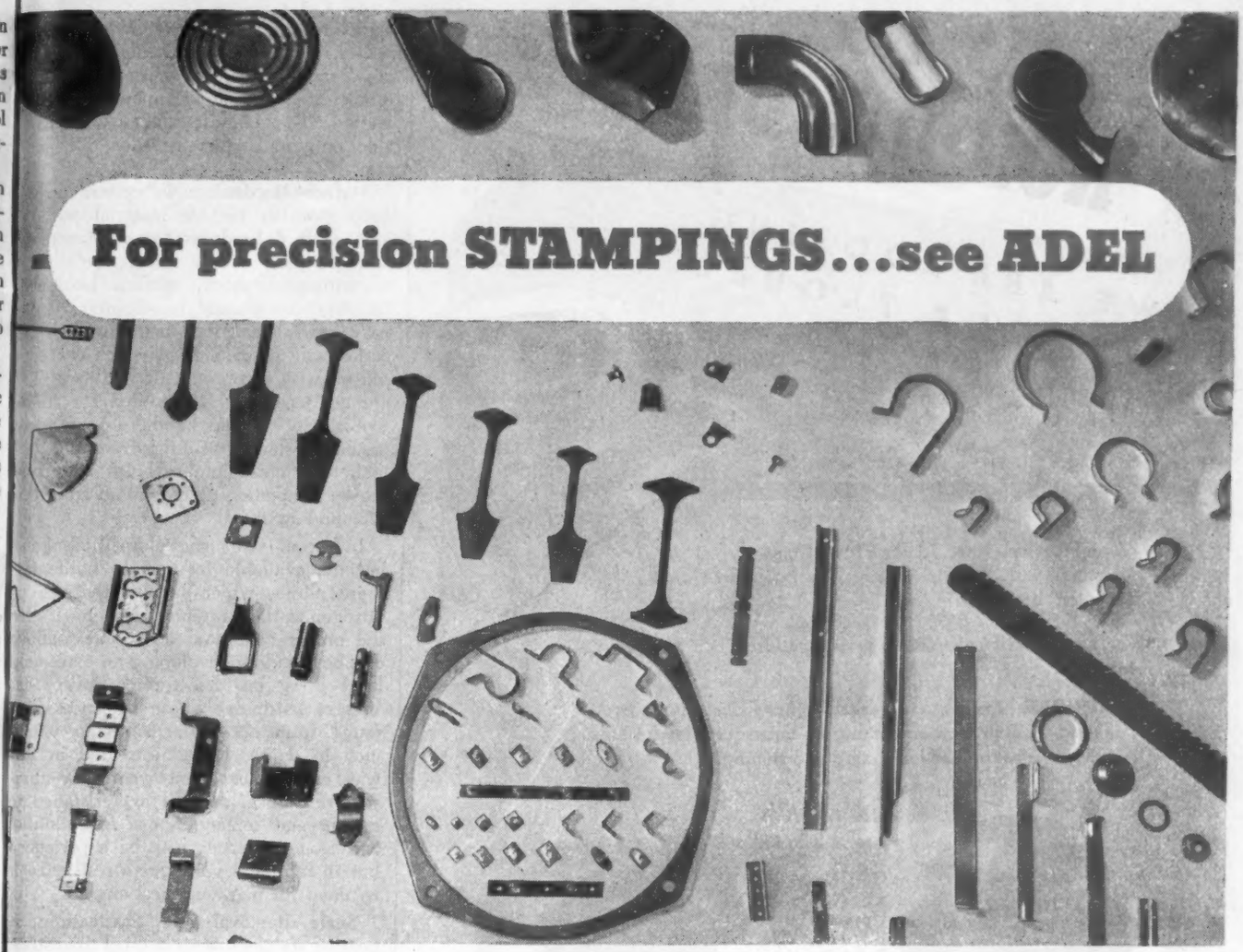
The stabilized grades are softened by annealing similar to the other austenitic steels. More complete stabilization is secured at the lower annealing temperatures. When maximum ductility is required for subsequent severe cold forming operation, the upper part of the range may be used.

A further treatment, consisting of heating the annealed or welded material to 1600 to 1650 degrees Fahr. for one to three hours and air cooling or water quenching, is sometimes employed. This "stabilization" treatment is intended to secure complete precipitation of all carbides as stable titanium or columbium carbides and improve corrosion resistance. In many cases this treatment is not necessary since the alloys are sufficiently stabilized by annealing. However, where parts are fabricated by welding and later will be exposed to temperatures within the range of 900 to 1650 degrees Fahr. in service, they should be annealed or stabilized as a final operation.

Average mechanical properties of Group III steels when annealed are given in Table XIV. Where these austenitic alloys are cold-drawn or otherwise cold-worked to develop high strength, a low draw or stress-relief serves to increase the elastic properties. This treatment consists of heating parts within the range of 650 to 850 degrees Fahr. for 30 minutes to 2 hours and air-cooling. Table XIV shows the effect of stress-relieving mildly and severely cold-worked bars and wire. Photomicrographs of typical annealed structures of this group are shown in Fig. 18.

A number of considerations applying generally to stainless steels also will be of interest.

Hardening by Cold Working: Chart in Fig. 17, previously referred to, indicates the rapid cold work hardening characteristics of some of the chromium-nickel grades and the moderate work



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Just furnish the blueprints—and forget it. The job can be tooled, precision-stamped to close tolerances, heat treated, plated—and even assembled—with ADEL techniques which have been war improved to such production speed that your own product-assembly will move at a faster pace because of ADEL's all-around quick stamping service.

ADEL's batteries of punch presses (range up to 110 tons), and ribbon-forming machines have turned out over 250 million aircraft parts. Use these facilities, and ADEL *Design Simplicity* Engineering to tool, fabricate, process and assemble your parts all in one shop. ADEL plants are on either side of the country to provide speedy service to industry all over the U.S.A.

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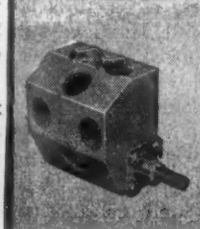

PRODUCTS OF *Design Simplicity* AND *Dependability*

The Aircraft and Transportation Division of ADEL manufactures precision controls for planes, boats, tanks, armament equipment. *Left:* ADEL "Mighty Midget" 4-way hydraulic selector valve. *Center:* ADEL Series "K" Fluid metering pump—outputs from .05 to 200 G.P.H. *Right:* ADEL "ISOdraulic remote control, remains syncronized from −65°F. to +160°F. *Trade Mark

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WE ARE LOOKING FOR TROUBLE

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They make bombs today so our children can have toys tomorrow.

TROUBLE—Excessive breakage first operation; overheating, galling, and scratching on subsequent operations. Daily removal of dies for honing and stoning.

SIZE OF WORK
Base 3-3/4", Flange 3/8", Cup Draw 3" x1-1/4" Depth. Upper Flange 1-3/4" Dia. Total Depth of Draw 1-3/4".

MATERIAL—Seven gauge hot rolled, pickled and oiled strip steel. Blank 5¾" Dia.

ANALYSIS OF TROUBLE—To find lubricant that would avoid breakage and building up a shoulder in the reverse bend of the upper flange.

RESULTS WITH KONDOR DRAW—Breakage immediately eliminated and production continued satisfactorily for several weeks with no die troubles as before.

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hardening rate of the straight chromium grades. In general the tensile and hardness ranges in the chromium-nickel group are dependent upon size and section. The highest ranges are available only in smaller sizes or thin sections.

Surface Hardening: In certain applications which require material with a high surface hardness for resistance to wear coupled with a softer tough core to withstand shock, surface hardened stainless steels may be desired. Ordinary case hardening methods such as carburizing or cyaniding, which are employed with carbon and low alloy steels, are not usually recommended for stainless steels because of the loss in corrosion resistance resulting from the formation of chromium carbides and consequent depletion of chromium from the surrounding metal.

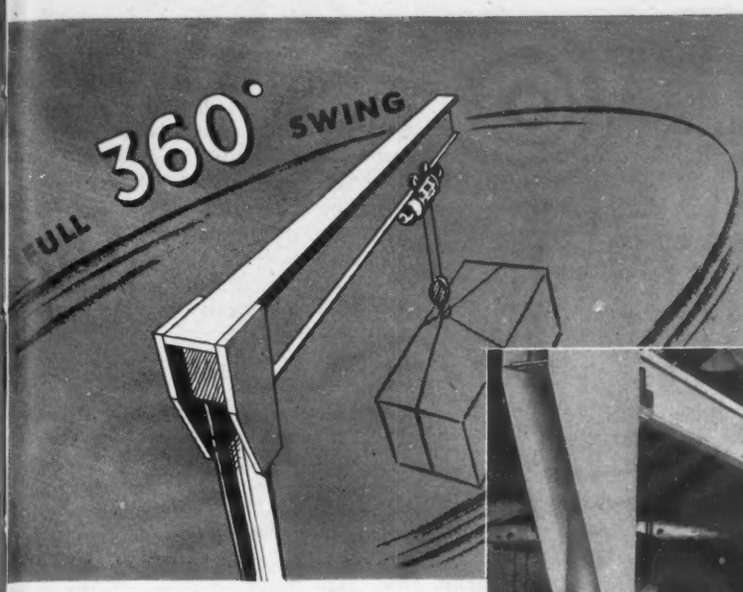
In recent years special methods have become available for surface hardening these alloys, which involve the use of nitrogen as the hardening element. Under the proper conditions all stainless alloys can be nitrided, developing an extremely hard layer on the surface (over 900 Vickers hardness) whose thickness may range from about 0.005 up to 0.025-inch in depth. Material treated in this way exhibits excellent wear and abrasion resistance, as well as resistance to galling and seizing. Some reduction of corrosion properties may be experienced but in most cases adequate resistance is retained for many applications.

Scale Removal and Passivation: In heating stainless steels in other than strictly nonoxidizing atmospheres, an oxide or scale forms on the surface which varies, depending upon the alloy, the time at temperature and the temperature used for heat treating. The lower alloy grades will scale or oxidize more at high temperatures than the higher alloy types.

The scale formed on the stainless steels is tenacious and quite impervious and, consequently, is somewhat more difficult to remove than scale on ordinary carbon steel. Two basic methods may be employed: Mechanical, such as sandblasting and tumbling, and chemical, such as pickling in acid solutions.

Sandblasting: No special technique is necessary for sandblasting stainless steel, but, if parts are to be placed in service with a sandblasted finish, they should be given a passivating treatment with nitric acid solution. This treatment removes iron particles and other extraneous material which tend to cause superficial rusting and discoloring of the surface of the stainless steel. It is not advisable to shot blast stainless steel parts with hardened steel grit, unless the blasted surface is entirely removed by grinding or machining.

Pickling: The scale formed on the stainless steels during the heat treating operations may vary greatly owing to heating environment and consequently



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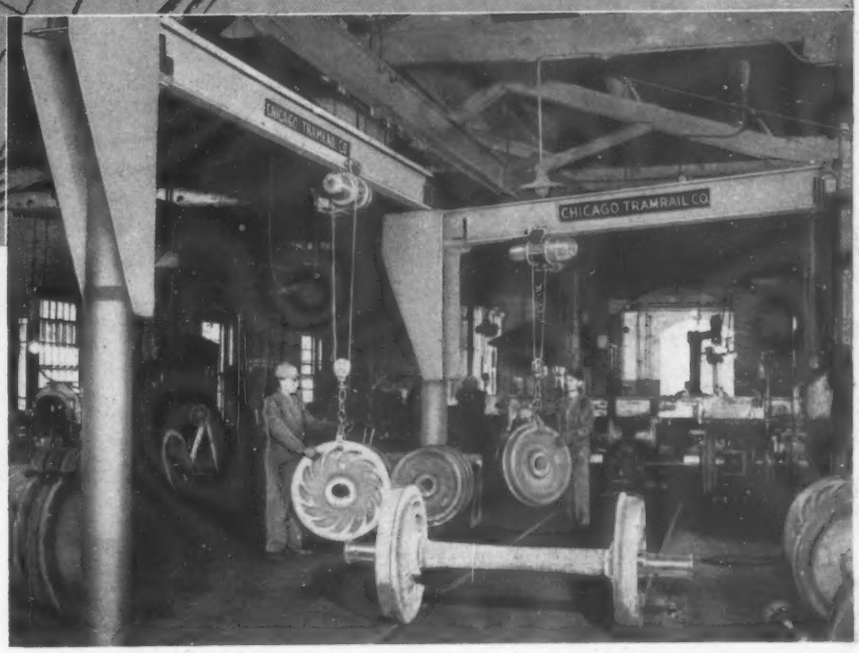

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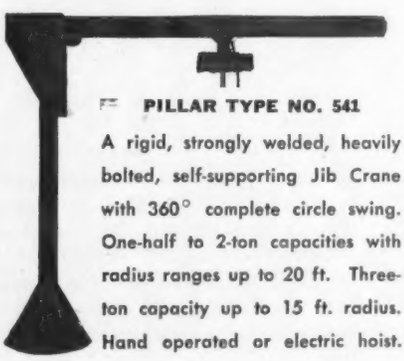
The assembly of railroad wheel-and-axle units is a job that calls for precise coordination in heavy handling. Too light a job for costly overhead cranes, and too dangerous for all but the most skilled manual labor, it is an ideal application for fast-action, flexible Jib Cranes. Working in conjunction, the two nimble Jib Cranes ease the wheels into place on the axle swiftly and surely, without danger to the delicate bearing surfaces of the axle or journal. This used to be a job for skilled workmen, but now easy-to-operate Jib Cranes take over the difficult task—a real help in these labor-scarce times.

Jib Cranes help to reduce compensation costs because they lessen the probability of accidents that are so frequent in heavy handling. For example; the operation above was formerly a dangerous one. Many strains and broken bones resulted from rolling the heavy wheels into position, but now the men have only to guide the free-swinging Jib Cranes as they swing around, pick up the wheel and carry it to the point of assembly.



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It's easy to see how swiftly, economically and safely Jib Cranes perform the operation illustrated. You can effect these same savings in your plant through the use of Jib Cranes. Look around your plant—you're sure to see many places where the use of these sturdy "mechanical muscles" will save you time and money as well as speed up production. Write for full particulars today. We will be glad to send you an illustrated circular showing the various types of Chicago Tramrail Jib Cranes together with many suggested applications for their use.

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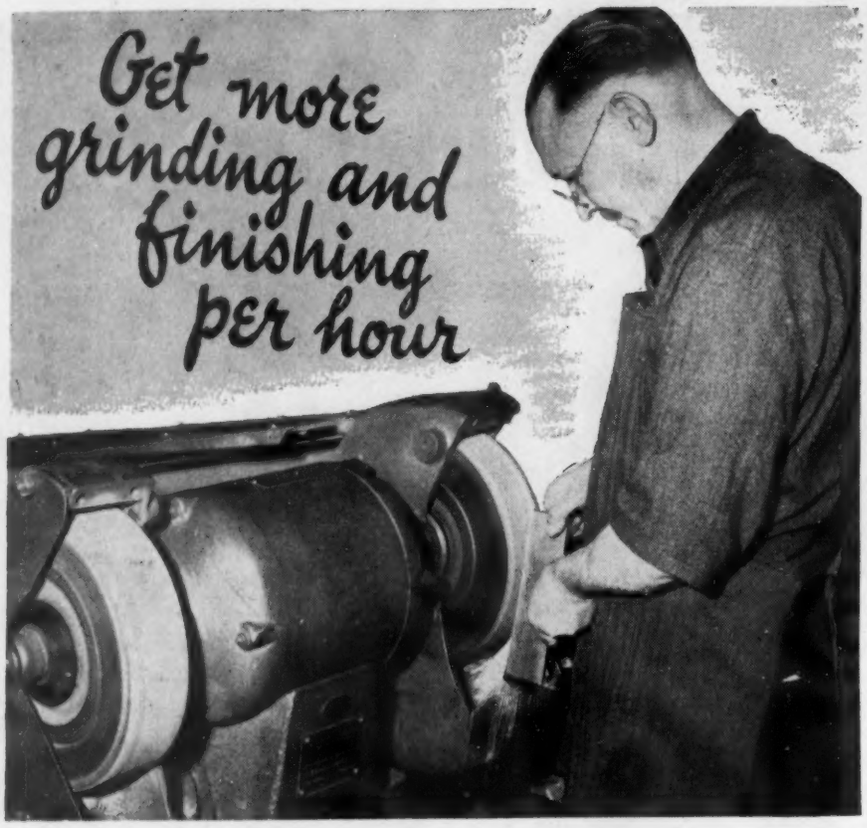

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will vary in response to removal by pickling in acid solutions.

Where the heat treating scale is heavy and the parts permit, tumbling before pickling will prove economical and time saving. Tumbling will remove much of the brittle scale and crack the underneath layers, thus affording a more uniform removal in the pickling baths.

The following methods are effective for removing most types of scale formed on the stainless steels during heat treating operations.

Method I.

Step I: (All grades) Immerse in a solution of 15 to 20 per cent by weight (9 to 12 per cent by volume) sulphuric acid, using a suitable inhibitor, for a period of 10 to 45 minutes at a temperature of 150 to 160 degrees Fahr. Treatment time will be governed by the type alloy being treated and the condition of the scale. Remove and wash with a pressure hose. Wood, ceramic or lead lined tanks can be used as containers for this solution.

Step II is applicable to the following types: 410, 402, 416, 414, 431, 420, 440 A, 440 B, 440 C, 430, 430 F, 442, 446 and 303.

Immerse in a 6 to 8 per cent by volume nitric acid containing 1½ per cent by volume hydrofluoric acid solution at room temperature for 10 to 30 minutes. Remove and wash with pressure hose. A wood tank is suitable as a container for this solution.

Alternate Step II is applicable to Types 301, 302, 304, 303, 308, 309, 310, 316, 321 and 347.

Immerse in a 8 to 10 per cent by volume nitric acid containing 1½ to 2 per cent by volume hydrofluoric acid solution at 140 to 160 degrees Fahr. Remove and wash with pressure hose. A wood tank is suitable as a container for this solution.

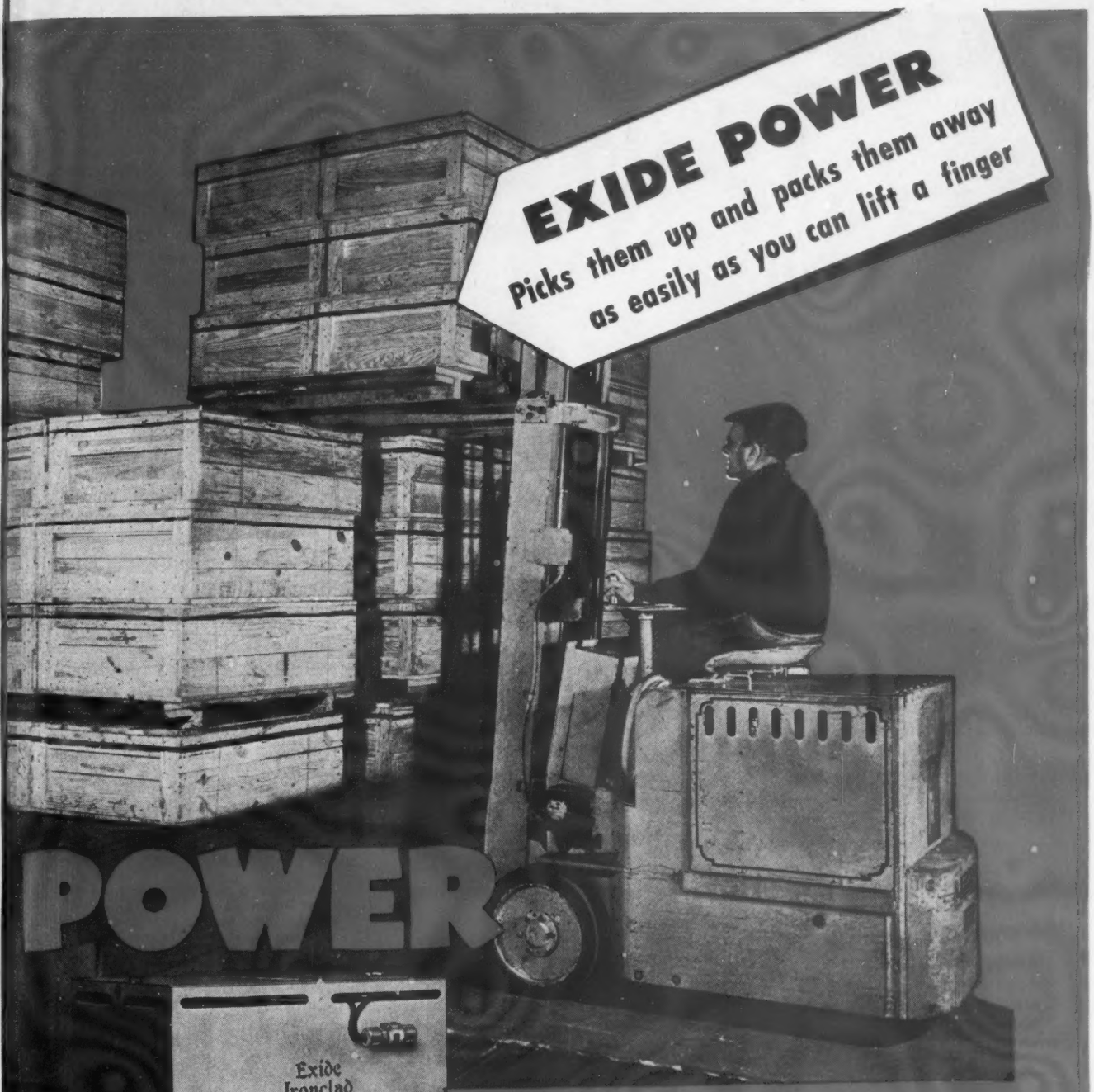
Method II

Step I: (All grades) Immerse in a 10 to 15 per cent by volume hydrochloric (muriatic) acid solution for ½ to 1½ hours at 120 to 140 degrees Fahr., using a suitable inhibitor. Remove and wash with pressure hose. Wood or rubber lined tanks are suitable as containers for this solution.

Step II: Same as outlined under Method I.

Passivation: The natural passive film on the surface of the stainless steels can be healed and fortified by subjecting these materials to the action of strong oxidizing chemicals, nitric acid being the most efficient. The surfaces must be free of scale, heavy grease and oil if the passivating treatment is to be effective.

Method I is applicable to Types 430, 430 F, 442, 446, 301, 302. 304, 303, 308, 309, 310, 316, 321 and 347. Immerse cleaned parts in a 20 to 40 per cent solution of nitric acid at 120 to



IN mills, factories and warehouses, unnumbered electric industrial trucks—powered by Exides—are lifting, hauling and stacking unit loads—helping to speed up production, to cut materials handling costs, to conserve vital manpower.

That so many Exide Batteries are employed in this important service, is due to three factors: Exides have the extra power needed to stand the heavy strain; their rugged construction keeps them on the job with minimum attention; and their ample reserves assure sustained speeds throughout each shift. You can always count on Exides for dependability, long-life and ease of maintenance.

Write us for a FREE copy of the bulletin "Unit Loads," prepared by The Electric Industrial Truck Association. It tells how to cut handling costs up to 50% . . . covers latest developments in materials handling . . . and includes actual case histories.

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NOW
A PROVEN WHEEL "YARDSTICK" FOR SURFACE GRINDING

Do you have a surfacing job that you are not now satisfied with? Does the wheel you are using tend to burn the work and fill up too quickly? Remove metal too slowly? Or does it wear too fast? Or leave a finish below your requirements?

If so, why not do what so many have done to find the best wheel for the job? Use the 846 K-1-V Dayton as your surface grinding "yardstick."

It cuts cool and fast. Gives an excellent finish. Wears at just about the right rate for topmost efficiency. Indeed, it's an even bet you will want to standardize on this 846 K-1-V Dayton. Short of that, it provides such a close measure of the important performance factors that repeated guesswork in wheel selection is usually eliminated.

The 846 K-1-V Dayton is made in a wide range of sizes—with trial wheels shipped from stock. Write, wire or phone.

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DAYTON CENTERLESS WHEELS

THE DAYTON WHEEL LINE
SURFACING
CENTERLESS
CYLINDRICAL
INTERNAL
SNAGGING

DAYTON GRINDING WHEELS

140 degrees Fahr. for 15 to 30 minutes. Remove and wash with water.

Method II is applicable to Types 410, 403, 416, 414, 431, 420, 440 A, 440 B, 440 C. The same method also is applicable to highly polished parts of all grades and will not cloud the surface. Immerse in a solution containing 18 to 22 per cent by weight nitric acid—1½ to 2½ per cent sodium dichromate at 110 to 120 degrees Fahr. for 15 to 30 minutes. Remove and wash with water.

Special Notes on Pickling: The high carbon grades should never be pickled in the fully hardened condition. Stress-relieving after hardening and before pickling is essential to avoid pickling cracks.

Care should also be taken in pickling these grades in the fully annealed condition. Unlike other stainless alloys, they are attacked in this condition by nitric acid and the surface of annealed parts may be roughened by overexposure to this acid.

Hydrogen embrittlement through exposure of stainless steels to reducing acids such as hydrochloric, hydrofluoric and sulphuric acids is generally not a problem with most stainless steels. The austenitic chromium-nickel and ferritic straight chromium steels are apparently not susceptible. The hardenable stainless steels of Group I in the fully hardened condition may sometimes be embrittled. With its high carbon content, Type 440 C is also sensitive in the annealed condition. Embrittlement may be overcome by baking at 200 to 600 degrees Fahr., preferably in steam.

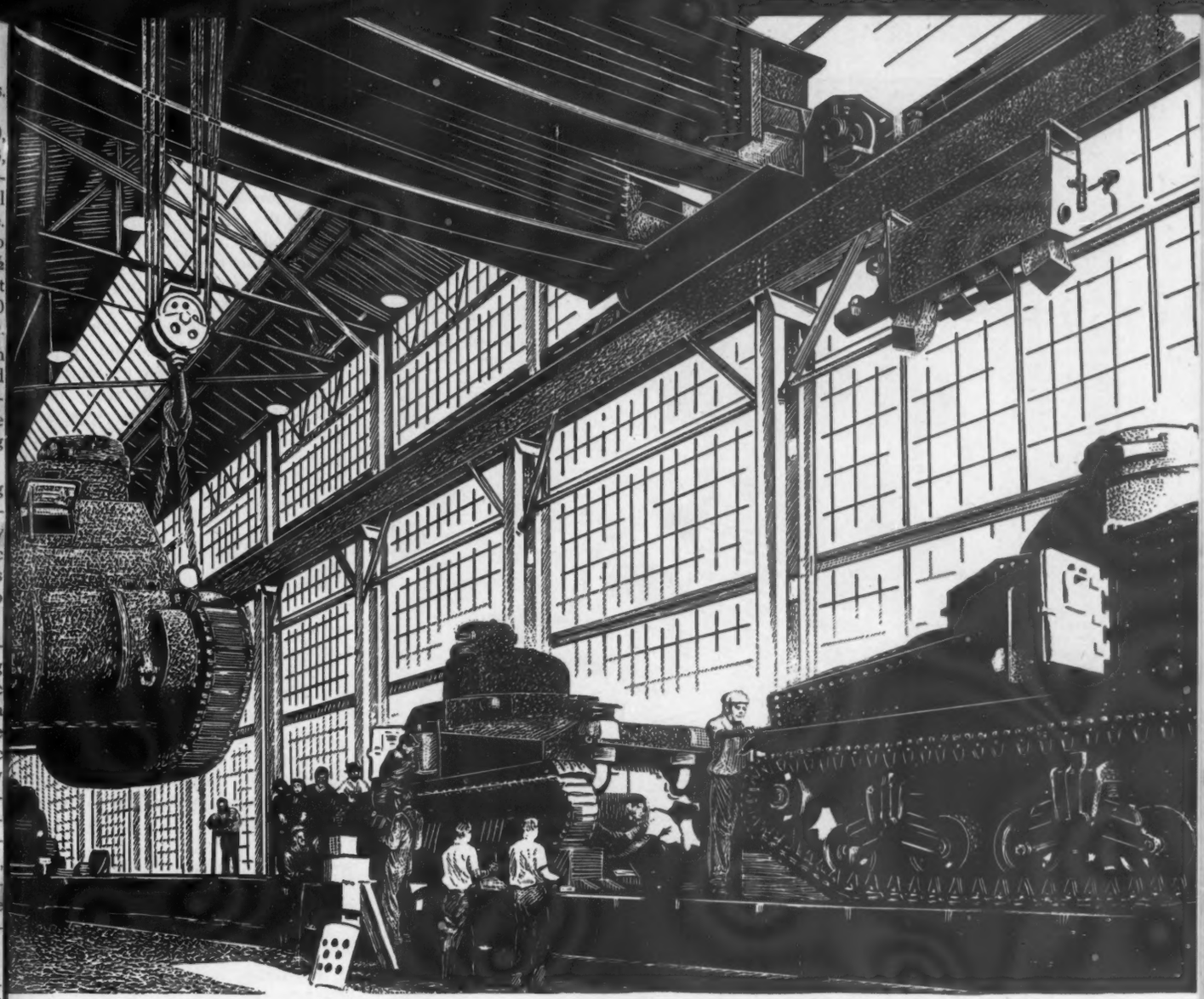
All data in this article and the first installment appearing in STEEL April 16 are from a copyrighted booklet published by the Rustless Iron and Steel Corp., Baltimore, and full reprint rights are retained by the company.

Centrifugal Pumps Discussed in Booklet

A handbook on pumps entitled "Self-Priming Centrifugal Pumps," is available from Marlow Pumps, Ridgewood, N. J. It sets forth the principles of centrifugal action, the physics of pumping, and the evolution of self-priming centrifugal pumps. Book is scientific in content, but use of illustrations and simple, straightforward language make it a work that almost anyone can understand. It offers basic engineering information, explains the difference between the types of self-priming centrifugals, points out where self-primers can be used with best effect, and contains detailed instruction on pump installation and care.

—o—

Evidence of how arc welding has kept pace with other industrial progress is given by a 400 ampere arc welder of 1917, weighing about 3500 pounds, as compared with a modern welder of the same capacity, which weighs only 1200 pounds, according to Lincoln Electric Co., Cleveland.



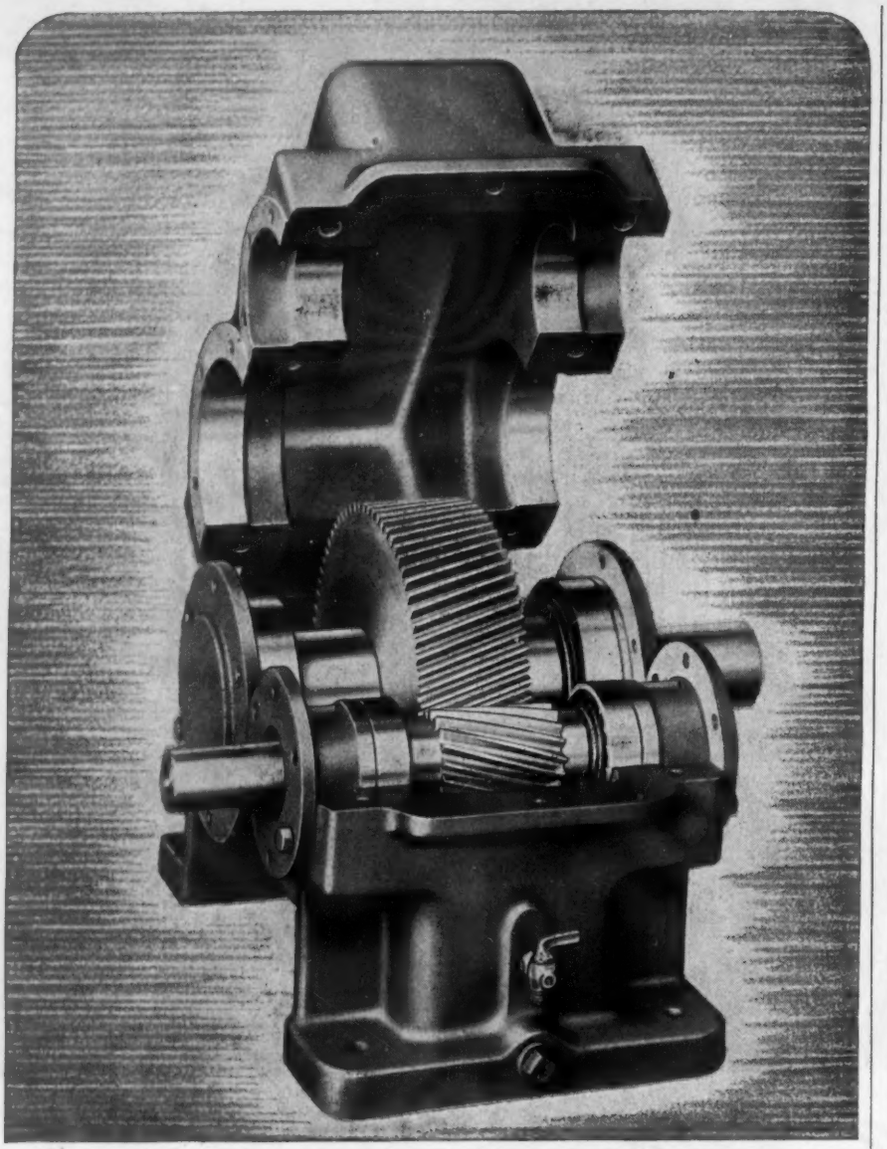
Welded Crane Rails SMOOTH THE WAY FOR MULTI-TON LOADS

Crane runway rails are generally a source of high maintenance costs due to the constant pounding absorbed by mechanical rail joints. The crane and structure are also subjected to repeated shock and vibration, resulting in broken wheels and added maintenance of fixtures and electrical systems.

Operators of heavy cranes have found the answer in Thermit welding of rail joints which transforms the rails into continuous ribbons of steel over which the cranes glide without a jolt or a jar.

Thermit welded joints are good for the life of the track. The welding may be done on the runway or on the ground by your own crew under the supervision of an M & T engineer. Send for new booklet, "Thermit Welding of Crane Runway Rail" which describes the process in detail. Metal & Thermit Corporation, 120 Broadway, New York 5, N. Y., Albany, Chicago, Pittsburgh, So. San Francisco, Toronto.

Thermit Welding



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★ Horsburgh & Scott Helical Speed Reducers are engineered for simplicity of design with every part ruggedly built from the finest materials. These features plus precision manufacture and assembly are your guarantee of better speed reducers that last longer . . . it will pay you to investigate these single, double and triple Helical Speed Reducers.

Send note on Company Letterhead for Speed Reducer Catalog 39

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

Making Die Castings

(*Concluded from Page 96*)

ducing the time and fuel needed to reheat the alloy.

Operation of Die Casting Machines: Between the melting department and the room in which die castings are trimmed is located the room for 15 die casting machines. Twelve of the machines were designed and made 10 years ago in the Yale plant, especially to suit requirements for making locks and padlocks. They are pneumatically operated with a plunger pressure range from 800 to 1400 p.s.i. and operate at temperatures ranging from 780 to 825 degrees Fahr. See Fig. 9. The other 3 are standard die casting machines.

The die casting machines average 150 to 300 "shots" per hour, depending upon size and complexity of the casting being made, since the cooling cycle controls the rate of production. The die castings are loaded into tote boxes, mounted on skids and quickly transported by Yale trucks to the trimming section. During long production runs, the dies are also periodically sent to the die making room for inspection.

To prevent harmful effects of "spitting" molten metal when the die casting machines are in operation, special shields are used. No serious burns have been reported in more than 5 years.

Protective Wax Removed by Wire Brush

A wire brush 1½ inches in diameter of 0.010-gage wire with a ⅜-inch hole and mounted on a flexible shaft, manufactured by Osborn Mfg. Co., 5401 Hamilton avenue, Cleveland, is used by Packard Motor Car Co., Detroit, to help remove wax from surfaces to be plated. In this spot plating operation 20 rocker levers are racked up at one time in a pan and covered with hot wax. Area on the levers which is to be plated is on the cam surface which happens to be on the upper side.

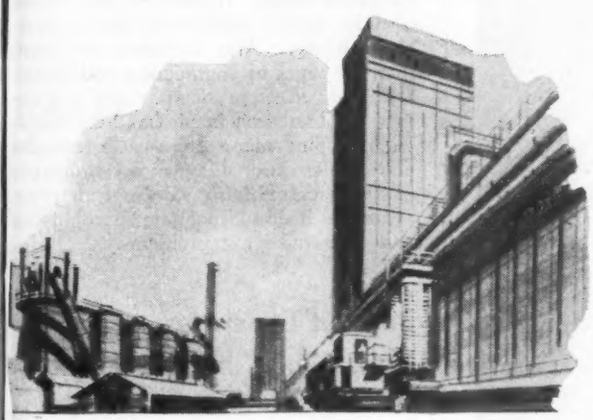
After the 20 rocker levers are covered with wax and the wax is frozen, a wire brush 1½ inches in diameter of 0.010-gage wire with a ⅜-inch hole, mounted on a flexible shaft, is used to help remove wax from the surface to be spot plated. Brush speeds mass plating process, removing wax quickly and within precisely controlled limits.

Principle of this operation, it is believed, could be applied to advantage in spot plating practices where plating is applied to only a portion of the surface, saving time in wax removal and helping to provide a clean cut surface on which plating is thrown.

—o—

Bulletin No. 113-A, describing series PMM-1 180 kilovolt-ampere seam welders, is available from Sciaky Bros., 4915 West 67th, Chicago. It contains general information and tooling data as well as actual machine specifications.

KOPPERS and Steel



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CM HERC-ALLOY SLING CHAINS boast service records as long as your arm

Ask any plant executive or safety engineer who has used CM Herc-Alloy Sling Chains... their experiences will prove the reasons why that once they are put on a job they "stick." In fact, CM Herc-Alloy Sling Chains shipped years ago are still in service.

The patented Inswell electric welded links and all fittings are of Herc-Alloy formula steel with a tensile strength of 125,000 lbs. per square inch... a safety factor of 150% compared to ordinary sling chain. Herc-Alloy seldom, if ever, requires annealing.

There is a size and type to handle *your* job and prove in service that here is sling chain value *plus* by any method of figuring.

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GENERAL OFFICES AND FACTORIES: 118 Fremont Ave., TONAWANDA, N. Y.
SALES OFFICES: New York, Chicago and Cleveland

Welding Rod Production

(*Concluded from Page* 98)

the new pass. In the new compact oven there is no dropping or rolling in the transfers. Also of marked interest is the delivery of extruded rod directly on to the brushing machine without use of a transfer conveyor.

The unit controlled panel is unique. On it are start-stop controls controlling each unit in the plant, plus a single emergency button controlling all units. One man, at the main operating station, thus has full command of controls without moving from the central operating station. In addition, a newly-patented electronic safety control which is part of the transfer mechanism, shuts down the entire plant in the event of misalignment of rods at any of the transfer points, which might cause the system to jam.

Similar plants with capacity up to 1000 electrodes per minute are contemplated.

Catalog Offered on Air Handling Equipment

A 199-page pocket size catalog and engineering data book entitled "What We Make" is available from B. F. Sturtevant Co., Hyde Park, Boston 36. It describes a line of air handling equipment and its application in a variety of industrial systems such as heating, ventilating, industrial air conditioning, drying, dust control, fume exhaust, vacuum cleaning, vapor absorption, etc., as well as construction, sizes, and condensed performance tables. It contains illustrations of units, system applications and sectional drawings. Also included are more than 80 pages of engineering and design data derived from many years' experience and research in air handling applications, plus many often-used formulas and tables and a new psychrometric chart for determining values of air properties in heating, cooling, humidifying and dehumidifying problems.

Booklet Describes Consulting Chemist Services

A revised, illustrated edition of "The Consulting Chemist and Your Business" is available from Foster D. Snell Inc., 305 Washington, Brooklyn 1, N. Y. After a brief outline of the type of business enterprise finding continual or occasional use for the services of consulting chemists, the booklet deals with the various branches of service offered. These include not only research in varied fields but rubber and plastics, investigations, organic synthesis, analytical service, physical testing, bacteriological services, physiological work and clinical studies, vitamin assay, plant inspections, chemical engineering, calibration service, surveys, current information service, legal testimony, and patents.

FOR YOUR *IMAGINEERS*

...Alcoa offers this new stain-resisting finish for Aluminum

Stove and equipment manufacturers were asking for a stain-resisting finish for aluminum —for oven liners, grease pans and the like. So Alcoa set their Imagineers to work. The result is this new Alumilite* finish.

What intriguing possibilities this stain-resisting finish suggests! Added beauty for your products—increased efficiency through faster heat distribution—easier upkeep—because *now* you can use Alcoa Aluminum in so many new places.

To manufacturers interested in testing this finish, Alcoa offers samples and finishing service. ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh 19, Penna.

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ALCOA FIRST IN **ALUMINUM**

ALCOA ALUMINUM

IT'S THE RIGHT KIND OF RADIANT HEAT!

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No longer is "passing-the-buck" a game to be played by paint men versus equipment men. No longer is the "buyer" in the middle as to whether paint or equipment is responsible for unsatisfactory results.

Penetray's exclusive ceramic coating improves wavelength, producing more intensive color, thorough curing and superior polymerization on metals. In addition, insect attraction is minimum because glare is reduced and improved uniformity of energy distribution results. Prove these points. Make your own tests for color and gloss; for corrosion and abrasives.

SALES ENGINEERS WILL CALL or DETAILS on REQUEST

LEARN TO SAY PENETRAY

VERD-A-RAY CORPORATION ■ TOLEDO 5, OHIO

Stress Relief

(*Continued from Page* 110)

tural geometry and of the welding sequence. In the longitudinal direction the restraint is largely a function of plate width and shape and resultant stresses are of yield point magnitude even in small weldments. During investigations, plates were free to move in welding and the only effect of restraint would have been to increase transverse stresses.

Special consideration should be given to longitudinal weld stresses as they are of yield point value and are not materially affected by welding procedures or methods. Significant plastic deformation occurs during stress formation, but their release requires only a small change in weld length or dimension. Change of dimension necessary for complete stress relief is of the order of 0.0015-inch per inch of weld length. Stresses are present in the weld area because the zone highly heated during welding tends to be relatively shorter after cooling than the adjacent plate metal, and by changing this relationship of length in some degree stresses correspondingly will be reduced. Inasmuch as the weld metal is strained to its yield point, any small load, the length relationship will be improved and stress correspondingly reduced. This principle is known as mechanical stress relief.

Applying Heat

It is impossible to apply this principle of stress relief to large welded structures by mechanical means. However, by utilizing the phenomenon that metal expands upon heating, areas adjacent to the high tension band along the weld can be expanded properly by controlled heating, thereby applying the equivalent of a mechanical load to the highly strained weld zone. This will cause the strained metal to flow plastically. Desired thermal loading is accomplished by simultaneously heating a band on each side of the weld, using special oxy-acetylene heating torches. Heat must be applied so as to maintain the proper temperature differential between weld and heated bands necessary to obtain desired stress relief. The temperature differential required to develop sufficient force to effect complete relief can be obtained by using temperatures not in excess of 350 to 400 degrees Fahr.

Application of heat when the temperature does not exceed 350 to 400 degrees Fahr. will not produce detrimental physical or metallurgical changes under these conditions. This has been proved by extensive tests on the metal, including fatigue, ductility, and tension investigations and metallographic examinations. Similar tests have been made on weld metal strained by the force developed by the application of heat, and no ill effects were observed. It is evident that the location and width of heat bands, the temperature differential, and the manner of maintaining this differential materially affect the results. Consequently, many series of welds were tested to determine the most effective

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ON some types of jobs Norton Open Structure Grinding Wheels are making spectacular records—especially where stock removal is heavy, where contact is broad, or where extra coolness of cut is essential. And the completeness of the Norton line of Open Structure wheels makes it possible to meet a wide variety of conditions.
Norton Open Structure wheels range in size from tiny internals to diameters as large as 24"—and include all popular segment shapes. They are available in three types of Alundum abrasive, and in Crystolon abrasive for grinding carbide tools.
Let a Norton abrasive engineer study your grinding jobs and specify Open Structure for those on which they can save you time and money.
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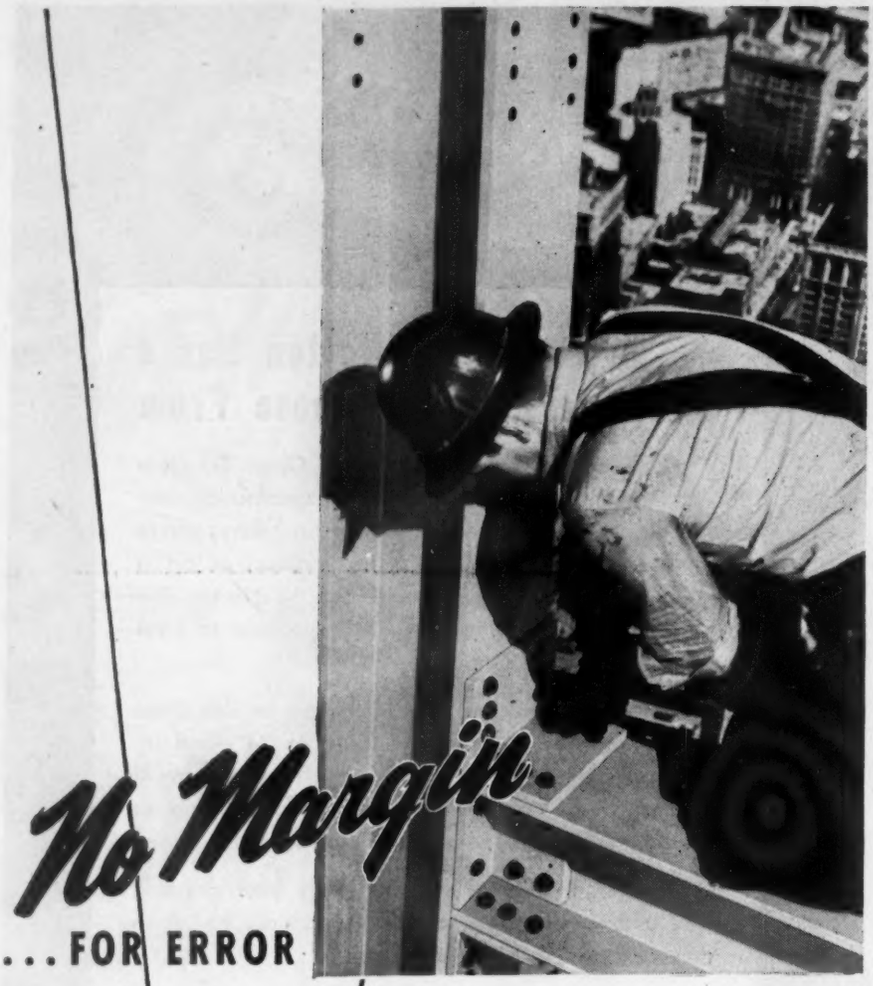

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...FOR ERROR

Five hundred feet below lies an acre of asphalt—and oblivion! No margin for error here... no room for a single false move.

It's the same way in building the power links which form the all-important connection between driving and driven units. No margin for error here, either!

For more than 26 years, Twin Disc has recognized this importance of *being sure*... being sure that Twin Disc Clutches and Hydraulic Drives *are right*... right in design—in construction—in application. Year after year this emphasis on "making it right" has paid dividends in smoother, more efficient transmission and control of power... has been reflected in the ever-growing list of powered equipment and machinery manufacturers who standardize on Twin Disc products.

Whether solution to your particular problem lies in friction clutches or hydraulic drives, Twin Disc engineers are ready with an unbiased recommendation—because Twin Disc builds both. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

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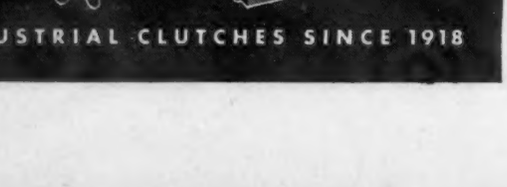


SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

combination of factors providing maximum stress relief.

Previous investigations have considered plates ranging from ⅝ to 1 inch in thickness. Work is continuing on plates up to 1¼ inches thick, which probably is the maximum thickness to be encountered in merchant ship construction.

Results of controlled low temperature stress relief, illustrated in Fig. 2, show stresses remaining in a typical ¾-inch weld after treatment. This weld was progressively stress relieved under optimum temperature conditions at a speed of 16 inches per minute. Stresses after treatment should be contrasted with those before treatment. For convenience of comparison, both are plotted on the same diagram. These curves do not represent a single test but the data from many tests and results can be duplicated with precision. Average residual weld stress after low temperature stress relief is less than 10 per cent of the residual longitudinal stress in the as-welded condition. Stresses remaining after treatment are comparable to those obtained with full furnace stress relief obtained at 1150 degrees Fahr.

Results of the investigation of controlled low temperature stress relief prove that residual welding stresses can be reduced effectively, and that the operation can be performed quickly, efficiently, and economically on critical welded joints in a ship.

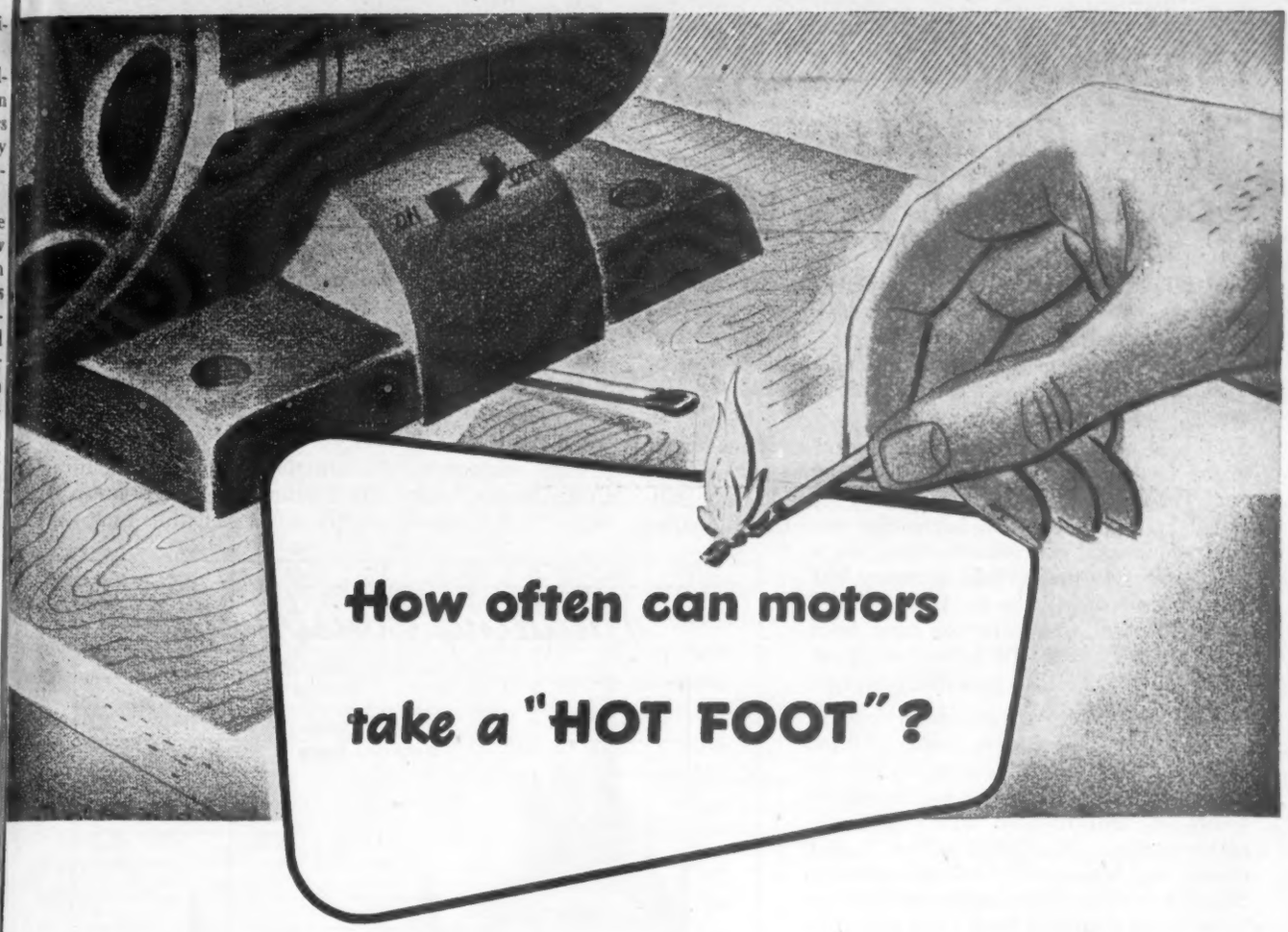
High Accuracy Machining Is Dealt With in Brochure

Unusual methods employed in manufacturing mechanisms calling for limits of accuracy of plus or minus 0.000025-inch are dealt with in a 20-page, 8½ by 11-inch brochure just released by W. H. Nichols & Sons, 48 Woerd avenue, Waltham 54, Mass.

Examples of the work on which such limits are maintained under mass production schedules, include gear pumps developed originally for use in rayon plants; pumps of so-called "gerotor" design used for metering and high pressure service—including that on hydraulic systems of industrial machinery; and modified versions of these pumps, designed for lubricating service on aircraft superchargers, propellor de-icers, etc. "Exploded" views of these mechanisms are presented to show all of the details involved.

Machining and gaging methods which make possible such close limits—which in turn make possible strict interchangeability without resorting to preselection of parts—are illustrated and described. Equipment involved includes: Universal measuring microscope apparatus; surface lapping machines; precision boring machines; form grinders for rotors; hole spacing and grinding machines; and air and electric gages.

Copies of this brochure are available free-of-charge to executives who identify themselves by writing for it on their company's letterheads.



How often can motors take a "HOT FOOT"?

Overloads, dirt, corrosive acids, heat, moisture *and the human element* can all play tricks on even the best designed motors. Any one, or a combination of them, can give your motor a "hot foot" once too often, then — failure.

Most motors are designed, by experts, to do their specific jobs efficiently. Most of them are built to give trouble-free service and to operate economically. Without the motor manufacturers' design and production skill American industry would be at a standstill today. Yet, the records show that motor failure still imposes an extremely heavy time and dollar loss on every industry.

Fiberglas* Electrical Insulation Materials have proved their ability to protect motors of all types from the conditions which cause a majority of the failures. They provide that "extra" protection which assures longer, more economical operation and decreases down time and its consequent production losses.

Fiberglas Insulation cuts rewind shutdowns

Typical of the advantages which Fiberglas Insulation provides is this experience of a concern in the metal-working industry.

A manufacturer of automotive parts was using 3 h-p, squirrel-cage, 3600 rpm motors to drive fans for operator and hot stock cooling. The motors were operated in high ambient temperatures and exposed to dust, grit and metal scale. The motors were failing at sixty-day intervals. Operators complained and the production line was slowed down while motors were being replaced and rewound.

Then these motors were rewound with the same size and type of wire, but with Fiberglas Insulation throughout. They have been in operation for over a year, with no failures to date.

And remember, the only added cost in rewinding with Fiberglas is the slight difference in the cost of the insulating materials.

Fiberglas Electrical Insulation Materials, in plain and treated forms, are available now. For complete information consult your distributor or write for new catalog. *Owens-Corning Fiberglas Corporation, 1873 Nicholas Bldg., Toledo 1, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.*

* * *

BE SURE TO SEE THE FIBERGLAS ELECTRICAL INSULATION MATERIAL EXHIBIT

THE NEXT SHOWINGS ARE: Muehlebach Hotel, Kansas City, April 17-18; Hotel Adolphus, Dallas, April 24-25; Hotel Rice, Houston, May 1-2. Appearances in other cities will be announced later.

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YARDS • TAPES • CORD • SLEEVING • CLOTH AND OTHER FORMS. Also available in: Magnet wire, Lead wire, Special wires, Varnished cloth and tape; Mica Combinations: Laminates, Saturated sleeving, Varnished tubing, Pressure sensitive tapes, Special products.

THE BUSINESS TREND

Further Cut in Civilian Goods Output Not Likely

FURTHER stringency of essential civilian goods manufacturing, which might be deduced from present war production schedules, may not occur in view of the distinct possibilities in the near future of an end to the European hostilities with consequent revisions of munitions requirements.

Flow of nondurable goods, measured in constant prices, to the civilian economy during the first quarter was virtually unchanged from the same 1944 period, and estimated at only one-eighth below the record first quarter 1942 showing. For manufacturing as a whole, sales to the civilian economy last quarter are estimated by the United States Department of Commerce to have been at an annual rate of $60 billion, or about the same as in the like period a year ago.

INVENTORIES—Further reduction in inventories to the lowest point in three years occurred during February. The total liquidation of stocks among manufacturers of both durable and nondurable goods was more than $200 million in that month, and was equally divided between the two groups. This further curtailment brought the estimated book value of manufacturers' total inventories on Feb. 28 last to $16.3 billion, or 8 per cent below that recorded on the comparable date last year.

Due to the shorter month manufacturers shipped $12.8 billion worth of goods in February, against $13.2 billion during the preceding month. On a daily average basis shipments in the month were respectively 10 and 7 per cent above January in the durable and nondurable goods industries.

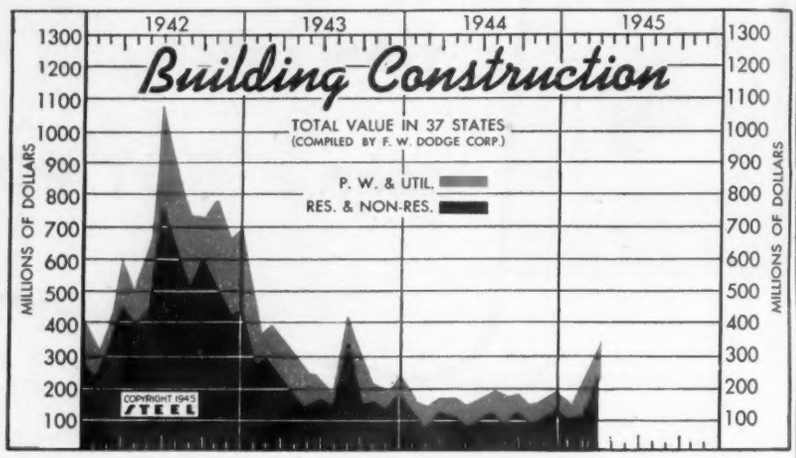
New business continued to be placed with manufacturers during February in about the same large volume as in the preceding month.

RAILROADS—For the first time since early 1923 there is now a net shortage of freight cars. In recent weeks the car surpluses of all class I railroads have been about 12,000 cars, while the shortages have been nearly 18,000 cars.

Domestic freight car awards in March were 2500 units, compared with 1750 in February and 7200 in January.

CONSTRUCTION—For the first three months this year construction contracts awarded in the 37 eastern states totaled $616,780,000, compared with $472,867,000 in the like 1944 period. The F. W. Dodge Corp. states that the main increase in building activity occurred in non-residential construction, especially buildings used for manufacturing purposes.

Civil engineering construction volume in continental United States totaled $52.2 billion during the latest week, to reach the highest weekly dollar valuation this year.



Construction Valuation In 37 States

(Unit —$1,000,000)

	Total		Public Works-Utilities			Residential and Non-Residential		
	1945	1944	1945	1944	1943	1945	1944	1943
January	140.9	159.2	39.8	50.3	85.8	101.2	108.9	264.3
February	147.0	137.2	32.0	55.1	112.9	115.0	82.1	280.5
March	328.9	176.4	90.6	61.3	123.0	238.3	115.1	216.7
April	....	179.3	...	72.0	127.7	....	107.3	175.6
May	....	144.2	...	55.8	95.8	....	88.4	138.6
June	....	163.9	...	70.7	73.8	....	93.1	156.8
July	....	190.5	...	80.5	50.0	....	110.0	133.7
August	....	169.3	....	69.4	73.4	....	99.9	340.8
September	....	175.7	...	64.1	175.1	....	111.6	125.0
October	....	144.8	...	52.2	63.5	....	92.6	150.0
November	....	164.9	...	48.0	59.0	....	116.9	125.4
December	....	188.5	...	66.6	67.4	....	121.8	184.9
Total	....	1,993.9	...	746.0	1,106.9	....	1,247.2	2,106.4

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	94.5	96.5	95.0	98.5
Electric Power Distributed (million kilowatt hours)	4,332	4,322	4,398	4,307
Bituminous Coal Production (daily av.—1000 tons)	1,292	2,017	1,838	2,060
Petroleum Production (daily av.—1000 bbls.)	4,811	4,784	4,774	4,432
Construction Volume (ENR—unit $1,000,000)	$52.2	$33.7	$40.8	$32.9
Automobile and Truck Output (Ward's—number units)	20,470	20,645	20,505	17,030

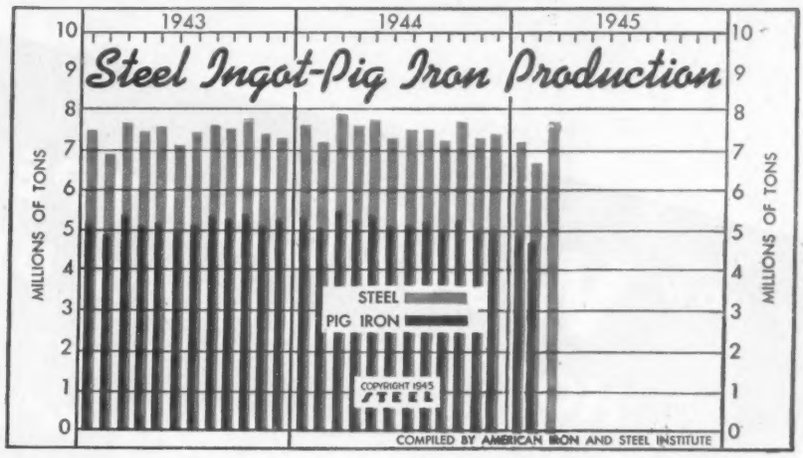
*Dates on request.

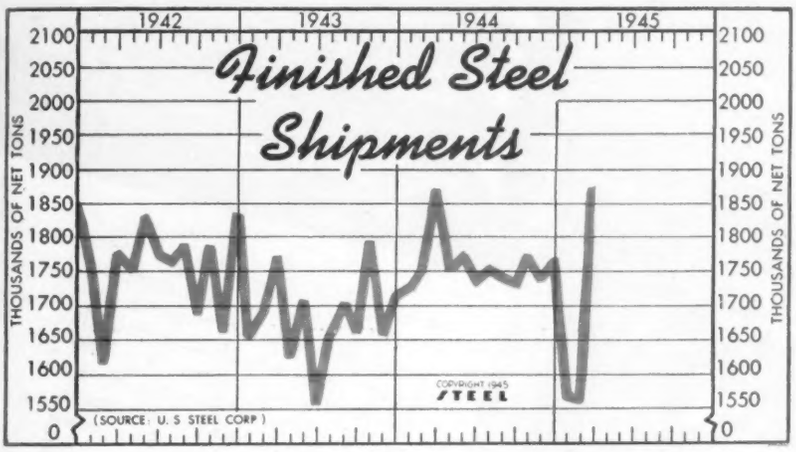
TRADE				
Freight Carloadings (unit—1000 cars)	780†	765	816	785
Business Failures (Dun & Bradstreet, number)	17	23	16	33
Money in Circulation (in millions of dollars)‡	$25,944	$25,865	$25,881	$21,295
Department Store Sales (change from like week a year ago)‡	+8%	+25%	+19%	+32%

†Preliminary. ‡Federal Reserve Board.

Iron, Steel Production
(Net tons—000 omitted)

	Steel Ingots			Pig Iron	
	1945	1944	1943	1945	1944
Jan.	7,204	7,587	7,425	4,945	5,276
Feb.	6,653	7,188	6,825	4,563	5,083
Mar.	7,725	7,820	7,675	....	5,434
Apr.	....	7,588	7,374	....	5,243
May	....	7,697	7,550	....	5,343
June	....	7,229	7,039	....	5,057
July	....	7,493	7,408	....	5,157
Aug.	....	7,493	7,586	....	5,210
Sept.	....	7,230	7,514	....	4,988
Oct.	....	7,616	7,814	....	5,200
Nov.	....	7,274	7,374	....	4,904
Dec.	....	7,361	7,266	....	4,999
Total	....	89,576	88,873	....	61,894





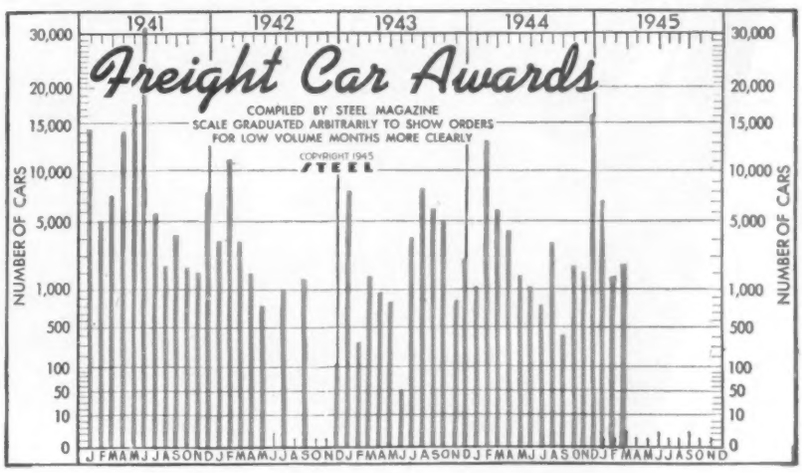
U. S. Steel Corp.'s Finished Steel Shipments
(Net Tons)

	1945	1944	1943	1942
Jan.	1,569,115	1,730,787	1,658,992	1,738,893
Feb.	1,562,488	1,755,772	1,691,592	1,616,587
Mar.	1,869,642	1,874,795	1,772,397	1,780,938
Apr.	.....	1,756,797	1,630,828	1,758,894
May	.....	1,776,934	1,706,543	1,834,127
June	.....	1,737,769	1,552,662	1,774,068
July	.....	1,754,525	1,660,762	1,765,749
Aug.	.....	1,743,485	1,704,289	1,788,650
Sept.	.....	1,733,602	1,664,577	1,703,570
Oct.	.....	1,774,969	1,794,968	1,787,501
Nov.	.....	1,743,753	1,660,594	1,665,545
Dec.	.....	1,767,600	1,719,624	1,849,635
Total	.....	21,150,788	20,244,830	21,064,157
Adjustment	.....	.....	*97,214	*449,020
Total	.....	.....	20,147,616	20,615,137

*Decrease.

Freight Car Awards

	1945	1944	1943	1942
Jan.	7,200	1,020	8,365	4,253
Feb.	1,750	13,240	350	11,725
March	2,500	6,510	1,935	4,080
April	....	4,519	1,000	2,125
May	....	1,952	870	822
June	....	1,150	50	0
July	....	795	4,190	1,025
Aug.	....	3,900	8,747	0
Sept.	....	400	6,820	1,863
Oct.	....	2,425	5,258	0
Nov.	....	1,065	870	0
Dec.	....	16,245	2,919	135
Total	....	53,221	41,355	26,028


Freight Car Awards
1941
1942
1943
1944
1945
COMPILED BY STEEL MAGAZINE
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
COPYRIGHT 1945 STEEL
NUMBER OF CARS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

FINANCE

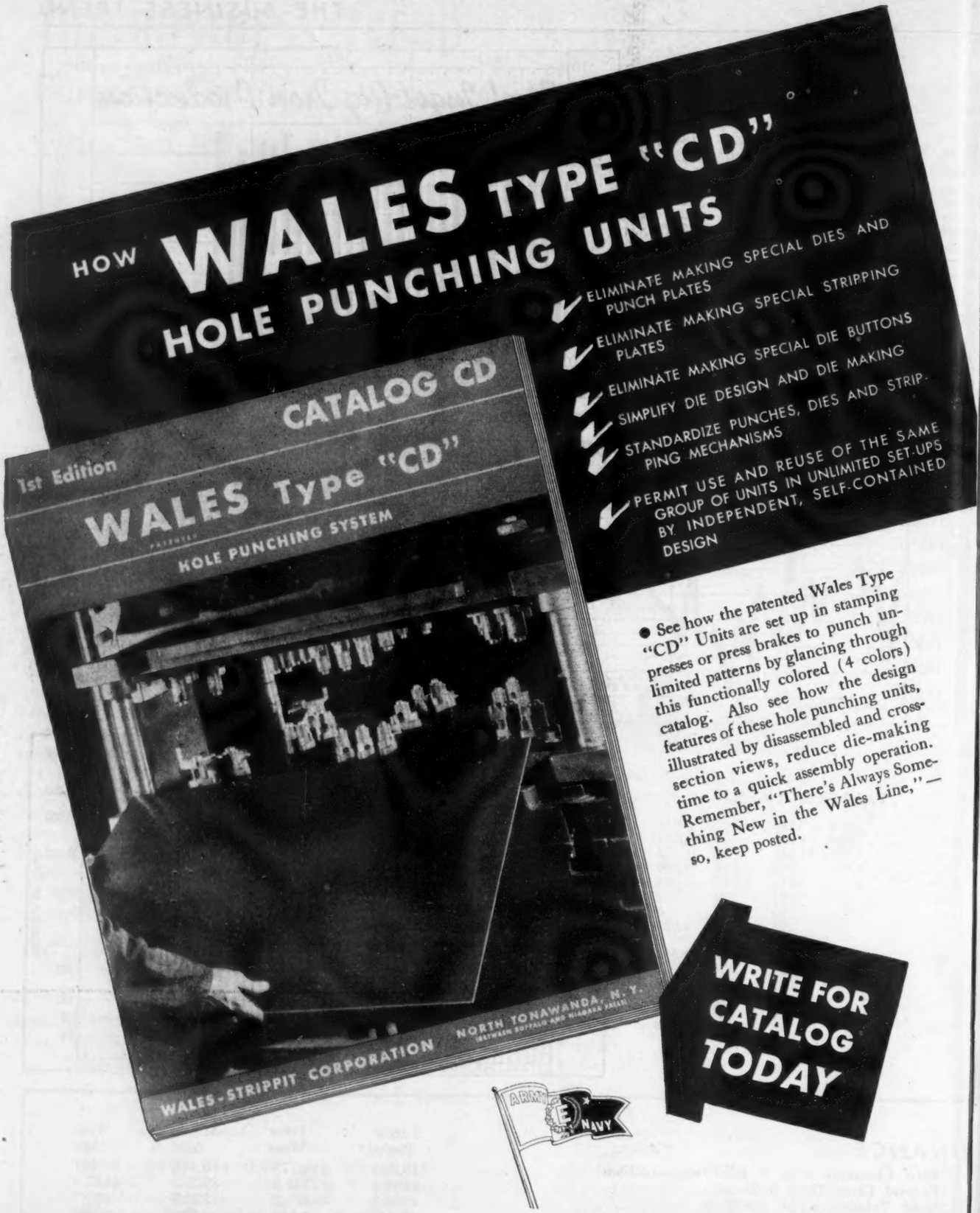
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$10,243	$10,175	$10,485	$8,437
Federal Gross Debt (billions)	$235.2	$235.0	$235.3	$187.0
Bond Volume, NYSE (millions)	$39.8	$38.5	$52.5	$52.7
Stocks Sales, NYSE (thousands)	5,241	3,560	4,503	3,395
Loans and Investments (millions)†	$57.3	$57.8	$58.4	$51.6
United States Gov't. Obligations Held (millions)†	$43,286	$43,565	$43,977	$37,961

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$57.55	$57.55	$57.55	$56.73
All Commodities†	105.1	105.1	105.1	103.7
Industrial Raw Materials†	116.1	116.2	116.2	113.6
Manufactured Products†	101.9	101.9	101.8	100.9

†Bureau of Labor Index, 1926 = 100.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War Cutbacks Affect Steel Orders Less Than Expected

Consumers instructed to hold orders with mills for future programs . . . Directives to be curtailed further by WPB

STEEL cancellations are developing, but are much less than might be expected in view of recent cutbacks in the war program. This is ascribed in part to the fact that some of the tonnage affected had been projected so far into the future as never to have been fully reflected in mill schedules.

An important factor is instruction by ordnance officials in a number of instances, to manufacturers whose work was cut back, to keep orders with mills, pending word as to ultimate disposition of the steel. Some of this may be cancelled but it is obviously the idea of ordnance officials that much of the tonnage can be put to use, if not by the manufacturer for some new contract which may be in the making, then by some other company engaged in similar work.

It is claimed that while the recent reduction in the shell program was due mainly to smaller overall needs than when schedules were laid out, it also provides greater concentration of skill and materials on types of ammunition in more urgent need than ever before, notably rockets. Even in shells, where programs have been cut, production is likely to be accelerated at other points with estimated needs rounded by making more materials available to those already organized and familiar with the work.

Whatever final procedure in handling much of the tonnage released by shell cutbacks there have been some outright cancellations, especially in steel required for equipment and facilities. An eastern Pennsylvania foundry and machine company has received a cancellation for equipment of nine shell lines and now is cancelling subcontracts, with steel for the entire program also being cancelled.

Latest curtailment in the war program is in aircraft, with official estimates pointing to heavier general reductions after V-E Day than had been predicted at any time since early last fall. The trade therefore is buying cautiously and relying more than ever on inventories.

War Production Board discloses that third quarter production of shell steel billets are expected to level off at about the June, 1945, pattern, which is somewhat above present shell steel schedules but below recent third quarter estimates. Proposed new programs are expected to offset to a large extent the cutbacks following V-E Day.

New plans to curb use of directives on steel mill orders that take precedence over CMP allotments include an effort to use directives only to advance deliveries within the current quarter. Future directives will be issued only on certification by a claimant agency that an earlier delivery is required to meet a genuine emergency. No directives will be issued to set up complete new programs.

Estimated steelmaking operations last week were at 92 per cent of capacity, a decline of 2½ points. Pittsburgh advanced 1 point to 89½ per cent, Cincinnati 3 points to 92, Cleveland 5 points to 94½ and New England 2 points to 92 per cent. Eastern Pennsylvania declined 3 points to 91, Detroit 4 points to 86 and Wheeling 1 point to 92½. Birmingham dropped to an estimated 40 per cent of capacity. Rates were unchanged as follows: St. Louis 80; Buffalo 90½; Chicago 98½; Youngstown 91.

Scrap conditions in general are steady, with supply sufficient for consumers and more material available than dealers are able to process under shortage of labor. Melters are not anxious to add to reserves beyond a safe minimum, in fear of a sudden turn in the market. Supplies at Buffalo are being sustained by cargoes from the head of the lakes and some material is moving by barge from the seaboard to the same destination.

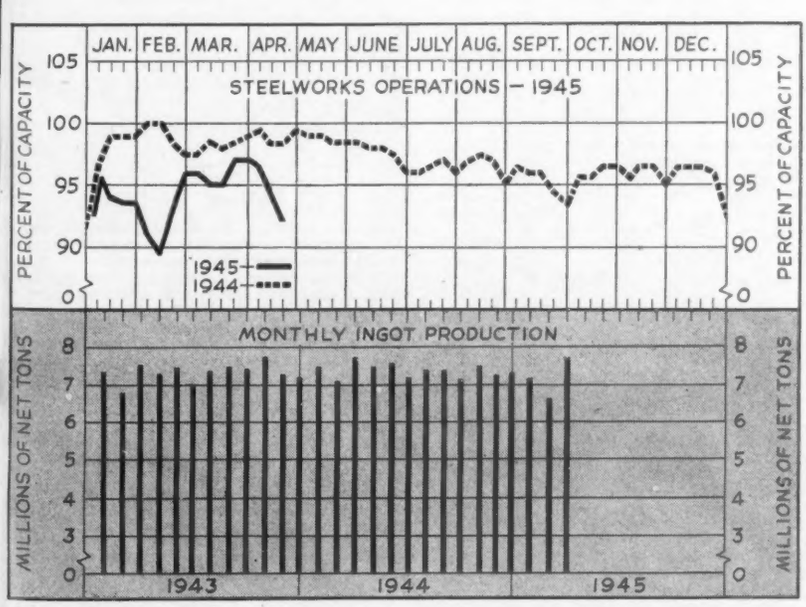
Average composite prices of steel and iron products are unchanged at ceilings, finished steel at $57.55, semifinished steel $36, steelmaking pig iron $24.05 and steelmaking scrap $19.17.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Apr. 21	Change	Same Week 1944	Same Week 1943
Pittsburgh	89.5	+1	93.5	98.5
Chicago	98.5	None	101.5	98.5
Eastern Pa.	91	—3	95	94
Youngstown	91	None	94	95
Wheeling	92.5	—1	98	88.5
Cleveland	94.5	+5	90	95
Buffalo	90.5	None	90.5	93
Birmingham	40	—45	95	100
New England	92	+2	89	95
Cincinnati	92	+3	81	97
St. Louis	80	None	77	93
Detroit	86	—4	88	96
Estimated national rate	92	—2.5	°98.5	°99

°Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	April 21	April 14	April 7	One Month Ago March., 1945	Three Months Ago Jan. 1945	One Year Ago Apr., 1944	Five Years Ago Apr., 1940
Finished Steel	$57.55	$57.55	$57.55	$57.55	$57.35	$56.73	$56.08
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	23.05	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	16.10

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	April 21, 1945	Mar. 1945	Jan. 1945	Apr. 1944
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.20	2.20	2.15	2.10
Plates, Philadelphia	2.25	2.25	2.225	2.15
Plates, Chicago	2.20	2.20	2.18	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.15	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.65	3.65	3.61	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.18	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.65	3.65	3.61	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.80	2.80	2.70	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	2.00	2.00	2.00	2.00

Finished Material	April 21, 1945	Mar. 1945	Jan. 1945	Apr. 1944
Bessemer, del. Pittsburgh	$26.19	$26.19	$25.19	$25.19
Basic, Valley	24.50	24.50	23.50	23.50
Basic, eastern del. Philadelphia	26.84	26.84	25.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	24.69	24.69
No. 2 foundry, Chicago	25.00	25.00	24.00	24.00
Southern No. 2, Birmingham	21.88	21.38	20.38	20.38
Southern No. 2 del. Cincinnati	25.30	25.30	24.30	24.30
No. 2 fdry., del. Phila.	26.34	26.34	25.84	25.84
Malleable, valley	25.00	25.00	24.00	24.00
Malleable, Chicago	25.00	25.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33

Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$19.75	$20.00
Heavy Melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	16.70	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$7.00	$7.00	$7.00	$7.00
Connellsville, foundry ovens	7.75	7.75	7.75	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35	13.35

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc. $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop., $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34; Detroit, del. $36; Duluth (bil) $36; Pac. Ports, (bil) $46. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. Ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40. Detroit, del. $42; Duluth, billets, $42; forg. bil. f.o.b. Pac. Ports, $52.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles).

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—$\frac{9}{32}$ in. inclusive, per 100 lbs., $2. Do., over $\frac{9}{32}$—$\frac{47}{64}$-in., incl., $2.15; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific Ports $0.50. (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.15c; Duluth, base 2.25c; Mahoning Valley 2.22½c; Detroit, del. 2.25c; Eastern Mich. 2.30c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c; Pac. ports, dock 2.80c. (Calumet Steel Division, Borg Warner Corp., and Joslyn Mfg. & Supply Co. may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		4100 (.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pitsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c.; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.65c; Granite City, base 3.75c; New York del. 3.89c; Phila. del. 3.82c; Pacific ports 4.20c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific Ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.75c; Granite City, base 2.85c; Detroit, del. 2.85c; eastern, Mich. 2.90c; Pacific ports 3.40c; **20-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.35c; Detroit del. 3.45c; eastern Mich. 3.50c; Pacific ports 4.00c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6 40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.20c; New York, del. 2.39c; Phila., del. 2.25c; St. Louis, 2.44c; Boston, del. 2.52-77c; Pacific ports, 2.75c; Gulf ports, 2.55c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire 2.60c
Spring wire 3.20c
(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.80; galvanized, $2.55; Pac. ports ..... $3.30 and $3.05
Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.05c
Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.40c
Woven fence, 15½ gage and heavier, per base column ..... .67c
Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	⅛	24	3½
¼ & ⅜	59	40½	¼	30	10
½	63½	51	⅜	34	16
¾	66½	55	½	38	18½
1-3	68½	57½	¾	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.07
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24 63	28.37	23.15	39.81
4"	10	30.54	35.20	28 66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $43.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $43 net ton, base, Standard spikes, 3.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49 00	52 00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33 00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller ..... 65½ off
Do., ⅜ and ⅝ x 6-in. and shorter ..... 63½ off
Do., ¾ to 1 x 6-in. and shorter ..... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long ..... 56 off
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-inch and less	62	64
1-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset, 1-in., smaller ..... 71 off
Headless, ¼-in., larger ..... 60 off
No. 10, smaller ..... 70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural 3.75c
⅞-inch and under ..... 65-5 off
Wrought Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. ... $2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.00
Connellsville, foundry	7.50- 8.00
Connellsville, prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	7.25- 7.75
By-Product Foundry	
Wise county, furnace	6.75- 7.25
Kearney, N. J., ovens	12.65
Chicago, outside delivered	12.60
Chicago, delivered	13.35
Terre Haute, delivered	13.10
Milwaukee, ovens	13.35
New England, delivered	14.25
St. Louis, delivered	†13.35
Birmingham, delivered	10.50
Indianapolis, delivered	13.10
Cincinnati, delivered	12.85
Cleveland, delivered	12.80
Buffalo, delivered	13.00
Detroit, delivered	13.35
Philadelphia, delivered	12.89

*Operators of hand-drawn ovens using trucked coal may charge $7.75, effective Nov. 29, 1943.
†13.85 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	4.012[1]	5.727[1]	3.874[1]	4.106[1]	5.106[1]	5.374[14]	4.744[24]	4.144[11]	4.715	6.012[22]	6.012[22]
New York	3.853[1]	3.758[1]	3.868[1]	5.574[1]	3.690[1]	3.974[1]	3.974[1]	5.160[13]	4.613[14]	4.103[22]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.868[1]	5.574[1]	3.690[1]	3.974[1]	3.974[1]	5.160[13]	4.613[14]	4.103[22]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.705[1]	5.272[1]	3.618[1]	3.922[1]	4.272[1]	5.168[13]	4.872[25]	4.072[11]	4.772	5.816[22]	5.860[22]
Baltimore	3.802[1]	3.759[1]	3.694[1]	5.252[1]	3.494[1]	3.902[1]	4.252[1]	5.044[1]	4.852[25]	4.052[22]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.896[1]	5.341[1]	3.696[1]	4.041[1]	4.391[1]	5.346[17]	4.841[25]	4.041[11]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	4.071[1]	5.465[1]	3.871[1]	4.165[1]	4.515[1]	5.521[17]	4.965[24]	4.165[22]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.55[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.55[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.73[1]	5.26[1]	3.45[1]	3.819[1]	3.819[1]	4.90[13]	4.40[13]	3.75[22]	4.669	5.60[22]	5.75[22]
Buffalo (country)	3.25[1]	3.30[1]	3.40[1]	4.90[1]	3.35[1]	3.81[1]	3.50[1]	4.80[13]	4.30[13]	3.65[22]	4.35	5.60[22]	5.75[22]
Pittsburgh (city)	3.35[1]	3.40[1]	3.50[1]	5.00[1]	3.45[1]	3.60[1]	3.60[1]	4.90[13]	4.40[24]	3.75[22]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.40[1]	4.90[1]	3.35[1]	3.50[1]	3.50[1]	4.80[13]	4.30[24]	3.65[22]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.50[1]	5.188[1]	3.45[1]	3.60[1]	3.60[1]	5.027[13]	4.40[24]	3.75[22]	4.45[22]	5.60[22]	5.65[22]
Cleveland (country)	3.25[1]	.....	3.40[1]	.....	3.35[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.65[22]	4.35[22]	.....	.....
Detroit	3.450[1]	3.661[1]	3.709[1]	5.281[1]	3.550[1]	3.700[1]	3.700[1]	5.15[13]	4.500[24]	3.800[22]	4.659	5.93[22]	5.93[22]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.265[1]	5.765[1]	3.965[1]	4.215[1]	4.215[1]	5.758[13]	5.443[24]	4.443[13]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.165[1]	5.665[1]	3.865[1]	4.115[1]	4.115[1]	5.658[13]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	6.391[1]	3.761[1]	5.291[1]	3.525[1]	3.675[1]	3.675[1]	4.975[13]	4.475[24]	4.011[22]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.55[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.35[1]	3.50[1]	3.50[1]	4.80[13]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.65[1]	5.15[1]	3.35[1]	3.60[1]	3.60[1]	5.381[13]	4.20[24]	3.75[22]	4.65	5.75[22]	5.85[22]
Milwaukee	3.637[1]	3.687[1]	3.787[1]	5.287[1]	3.487[1]	3.737[1]	3.737[1]	5.422[13]	4.337[24]	3.887[22]	4.787	5.987[22]	6.087[22]
Indianapolis	3.58[1]	3.63[1]	3.73[1]	5.23[1]	3.618[1]	3.768[1]	3.768[1]	5.068[13]	4.568[24]	3.98[22]	4.78	6.08[22]	6.18[22]
St. Paul	3.76[1]	3.81[1]	3.91[1]	5.41[1]	3.61[1]	3.86[1]	3.86[1]	5.407[13]	4.46[24]	4.361[22]	5.102	6.09[22]	6.19[22]
St. Louis	3.647[1]	3.697[1]	3.797[1]	5.297[1]	3.497[1]	3.747[1]	3.747[1]	5.322[13]	4.347[24]	4.031[22]	4.931	6.131[22]	6.231[22]
Memphis, Tenn.	4.015[6]	4.065[6]	4.165[6]	5.78[1]	4.065[6]	4.215[6]	4.215[6]	5.415[13]	4.78[24]	4.33[22]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.65[1]	5.908[1]	3.55[1]	3.70[1]	3.70[1]	4.90[13]	4.852[24]	4.54	5.215	.....	.....
New Orleans (city)	4.10[1]	3.90[4]	4.00[4]	5.85[4]	4.158[4]	4.20[4]	4.20[4]	5.40[26]	5.079[13]	4.60[22]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.35[3]	5.50[3]	3.863[3]	4.313[3]	4.313[3]	5.463[13]	4.10[13]	3.65[22]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	5.05[4]	7.20[4]	5.10[4]	4.95[4]	6.75[4]	6.15[13]	7.20[6]	5.583[30]	5.613	5.85[22]	5.95[22]
San Francisco	4.15[7]	4.35[7]	4.75[7]	6.35[7]	4.65[7]	4.50[7]	5.75[7]	6.50[13]	7.30[13]	5.333[22]	7.333	8.304[22]	8.404[22]
Portland, Oreg.	4.45[27]	4.45[27]	4.85[27]	6.50[27]	4.75[27]	4.75[27]	6.30[27]	5.90[15]	6.60[13]	5.533[15]	.....	.....	.....
Tacoma	4.35[6]	4.45[4]	4.85[6]	6.50[6]	4.75[6]	4.25[6]	5.45[6]	6.10[15]	7.05[13]	5.783[22]	.....	.....	8.00[22]
Seattle	4.35[6]	4.45[4]	4.85[6]	6.50[6]	4.75[6]	4.25[6]	5.45[6]	6.10[13]	7.60[13]	5.783[22]	.....	.....	8.00[22]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles. [19]—100 to 749 pounds; [20]300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50

Domestic (seller's nearest rail)

48% 3:1	52.80
less $7 freight allowance	

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10 .15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70 .90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	‡21.38	‡20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
§Pittsburgh, del. No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. ‡For phosphorus 0.70% or over deduct 38 cents. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)	$30.50		
6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos, 0.40 Sulphur, 1.00% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$34.00
Chicago, del.	37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$24.50
Valley base	24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$66.55

First Quality

Pa., Ill., Md., Mo., Ky.	52.85
Alabama, Georgia	52.85
New Jersey	57.70
Ohio	46.35

Second Quality

Pa., Ill., Md., Mo., Ky.	47.90
Alabama, Georgia	39.15
New Jersey	50.50
Ohio	37.10

Malleable Bung Brick

All bases	61.65

Silica Brick

Pennsylvania	52.65
Joliet, E. Chicago	60.65
Birmingham, Ala.	52.85

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	31.95
Wire cut	29.90

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. (After Aug. 29 base price any grade $30.)

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, eastern, central and western zones, $135; add $6 for packed c.l., $10 for ton, $13.50 less-ton; f.o.b. cars, New Orleans, $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central, 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome: Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58. 50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max., sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.023 central, $1.935 and $2.055 western, spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot, up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed, per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract, ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c, eastern, freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. ern, add .5c for c.l., and 2c for c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract bass, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15%, net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 156 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Bundles	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Machine Shop Turnings	13.75
Mixed Borings, Turnings	13.75
Shoveling Turnings	15.75
No. 2 Busheling	15.50
Billet, Forge Crops	21.25
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turning	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	11.50-12.00
Short Shovel Turnings	13.50-14.00
Mixed Borings, Turnings	11.50-12.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	12.50-13.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06*
No. 2 Heavy Melt. Steel	14.06*
No. 1 Bundles	14.06*
No. 2 Bundles	14.06*
No. 1 Busheling	14.06*
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel, Turnings	11.06*
Chemical Borings	13.06*
Low Phos. Clippings	16.56*
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

*Inland base ceiling; Boston switching district price 99 cents higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel, Turnings	16.00
Mach. Shop Turnings	14.00
Mixed Borings, Turnings	14.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	21.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	14.00-14.50
Cast Iron Borings	13.00-13.50
Machine Shop Turnings	12.00-12.50
Low Phos. Plate	21.00-22.00

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	11.00-12.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet, Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails, Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dir. Bundles	18.75
Baled Mach. Shop Turn.	16.25-16.75
No. 3 Galv. Bundles	14.25-14.75
Machine Turnings	9.00- 9.50
Mix. Borings, Sht. Turn.	12.00-12.50
Short Shovel Turnings	12.00-12.50
Cast Iron Borings	12.00-12.50
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	13.00
Short Shovel, Turnings	15.00
Mixed Borings, Turn.	13.00
Cast Iron Borings	14.00
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	8.75- 9.25
Short Shovel Turnings	14.75-15.25
Short Turnings	10.75-11.25
Cast Iron Borings	10.00-10.50
Low Phos Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	13.50-14.00

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	7.00- 8.00
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25

(Cast grades f.o.b. shipping point)

Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	7.50- 8.00
Shoveling Turnings	9.50-10
Cast Iron Borings	9.50-10.00
Mixed Borings, Turnings	8.50- 9.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	6.90
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.50
Tin Can Bundles	14.50
No. 2 Steel Wheels	16.00
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.00
Uncut Frogs, Switches	16.00
Scrap Rails	16.00
Locomotive Tires	16.00

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum; 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low-grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American, bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224-lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $158 to $163 in smaller quantities

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: S-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more: New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 150

Sheet buying is in less volume than recently, but mills still are loaded and deliveries on current orders run into fourth quarter. Part of the decline in orders is attributed to the delivery situation. Plate production on continuous mills is being reduced steadily, giving more sheet capacity, but labor needed for sheet processing is difficult to get. Hot-rolled pickled sheets, the grade most in demand, can be had in fourth quarter, though some producers can quote no earlier than January.

New York — Sheet mill backlogs are not increasing at the rate of a couple of weeks ago. Deliveries on most grades appear little, if any more extended, and in the case of stainless steel sheets the situation has actually eased. Some producers assert that their delivery promises on stainless are better by a month or so than they were recently. The precise reasons for this cutback in stainless have not been made clear to the trade, although there is speculation as to the likelihood of a reduction in the amount of stainless scheduled to be shipped abroad, to Russia in particular. This appears to be nothing much more than speculation, however.

Hot and cold-rolled sheets are still available in fourth quarter. This is especially true of plain hot-rolled sheets, although hot-rolled pickled can also be had before the end of the year, notwithstanding the fact that some producers have nothing to offer before January. Gavanized sheets are being quoted for shipment as early as October in some cases and as late as February in others.

Continuous strip mills are rolling less plate tonnage as time goes on. It is estimated that they are now turning out less than 100,000 tons a month, with the prospect that they will be well below that by the end of this quarter. There is more than ample tonnage in sheets and strip to take up any shrinkage in plate tonnage. However, strip mills are resisting too rapid transition because of the lack of extra manpower required for processing sheets.

Locally there is a continued lull in sheet buying which may be ascribed in part to the fact that nearby tonnage is practically out of the question and consumers show less interest in tonnage at the extended deliveries now being quoted, especially in view of the fact that the end of the war in Europe should not be far off.

Notwithstanding the fact that the war in Europe appears to be nearing an end, there does not seem to be as many "as, if and when orders" for civilian production as last fall, when it looked as if the European war would soon be terminated.

Boston — Fabricators of narrow cold-rolled strip are more hesitant in forward buying, although some fourth quarter volume is being placed, with October schedules filling in most cases. Cutback revisions involve some tonnage for small arms and ammunition components, but the total is not impressive. Demand for alloy strip is maintained and deliveries are more extended than for carbon; some producers are booked through the balance of this year. For transmission chair, inquiry for alloys is substantial. Heavy military requirements for pocket knives, standard four-blade tool, is heavy and increasing. For second and third quarter issue 9,700,000 knives are needed with an estimated production of 6,075,000. Several Rhode Island shops are heavily engaged. New orders for sheets have slackened without easing in delivery pressure; bomb and shell container and ammunition box needs are large. By amendment to CMP Regulation 4, carryover provisions are changed to prohibit filling of a steel order more than 60 days after the end of the quarter for which allotment was issued. No time limitation had been imposed hitherto where an order was accepted within the quarter for which the allotment was issued, the change being made to discourage advance ordering under the provision. In addition, small free steel provisions affecting stainless steel are reduced from 1000 to 300 pounds and deliveries on Z-1E orders are restricted to steel in inventory more than 120 days.

Cincinnati — Some cancellations of sheet tonnage have appeared, but not sufficient to reflect cutbacks due to approach of V-E Day. These cancellations have not relieved mills from the tight situation which exists partly because of a carryover which has delayed some scheduled deliveries by 30 days or longer. Ordering continues, with earliest delivery promises on hot and cold-rolled extending into January. Shell steel and galvanized allocations have been expanded in the district.

St. Louis — Directives in sheet mills are easing and a few order cancellations have been received. In all cases

The BROSIUS OPEN END BOX CHARGER

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these represent a shift in production rather than a reduction. Sheets are tight and deliveries are extended to December and January. A Navy order for land craft brought increased pressure on both sheets and plates. Two breaks in gas mains serving the St. Louis area recently shut down rolling capacity for hot-rolled sheets, strip, bars and plates except for a limited portion which could be shifted to oil. Among those affected were the two largest rolling mills and the two largest foundries. Production probably will be resumed this week.

Philadelphia — Hot and cold-rolled sheet schedules are fairly stable and this represents a change from two to three weeks ago. Backlogs are not being extended in so important a degree, due in part to certain cancellations and to a shrinkage of plate tonnage on strip mills, but principally to leveling off of demand. Strip plate production is now reliably estimated at about 100,000 tons a month, against 160,000 tons five or six weeks ago, with the possibility that the current monthly rate may be halved by the end of this quarter.

Plain hot-rolled sheets can be had in October and November, hot-rolled pickled in December and January, with a little available in November. Galvanized shipments still cover a wide range, with some sellers quoting September and October and others as late as February and March. Stainless steel deliveries are easier, with some producers quoting July, compared with August recently. Cutbacks in the aircraft program are believed to be mainly responsible. Some sheet and strip tonnage for bombs has been cancelled in the Philadelphia district recently.

Pittsburgh — Although there has been some cutback in munitions programs, there has been no definite word on reduction of any item involving substantial sheet tonnages. Sheet mill schedules continue bogged down, with a substantial volume of carryover tonnage sure to be extended into May. It is true, however, that new buying has declined somewhat but this cannot be regarded as concrete indication of future trends inasmuch as approximately enough tonnage is booked to keep sheet operations at capacity for a year. The situation is worst in galvanized sheets. Some sellers believe that additional manpower on galvanized lines might boost production enough to catch up with current delivery promises, but there is little hope of placing additional galvanized sheet tonnage this year. Delivery promises are extended through third quarter, and in some cases, through fourth quarter, with substantial volume of tonnage booked already for 1946 in both hot and cold-rolled sheets, and with the exception of narrow sizes, strip mills report a similar situation.

Steel Bars . . .

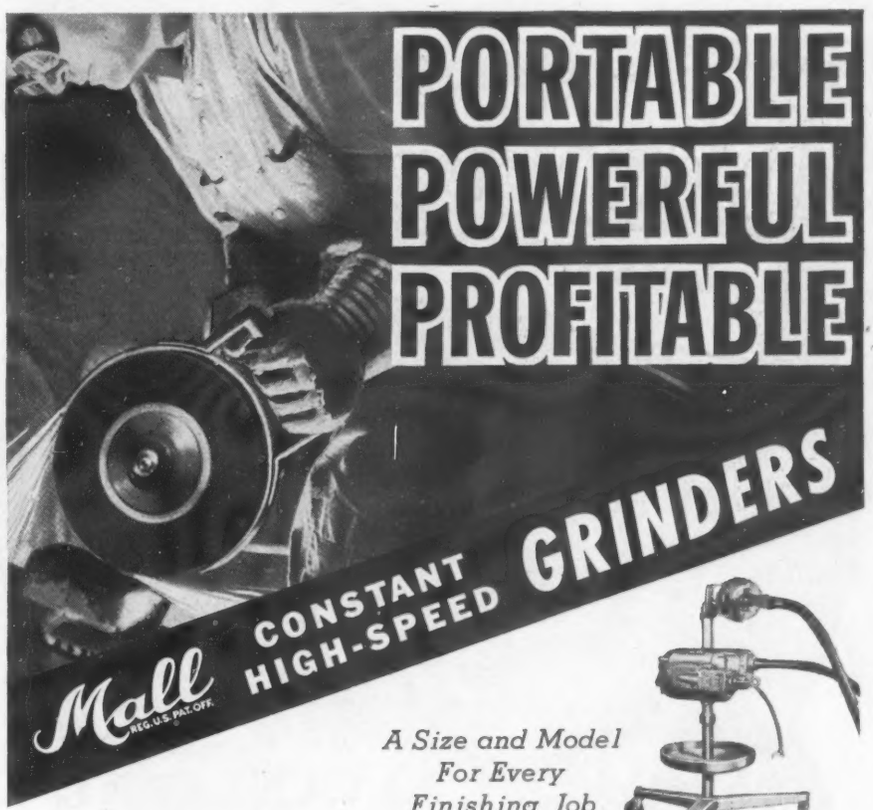
Bar Prices, Page 150

Bar deliveries are difficult to obtain before fourth quarter, with some producers quoting February or March on hot-top quality. Cold-drawn carbon bars are quoted for late this year. Some diameters of carbon bars can be had as early as September and some bar-size angles in July, but this is exceptional.

Philadelphia — Bar shipments still fall mainly in fourth quarter, with one leading producer quoting February or March on hot-top quality steel. Some small diameters of plain carbon can be had in September and some bar-size angles are available as early as July, but these schedules are the exception. Alloy bars now fall generally in fourth quarter, with electric furnace steel available in October and open-hearth steel in November and beyond. One producer quotes January on 2¼-inch and over. Cold-drawn steel bar producers have relatively little capacity available this year, especially on larger rounds, which with steel tubing, is in heavy demand for the rocket program.

Among companies in this district recently affected by shell cutbacks are: Lehigh Foundry Co., Easton, Pa., 60-mm shells; Airflow Corp., Wilkesbarre, Pa., Bonney Forge & Tool Works, Emmaus, Pa., and Coplay Cement Co., Allentown, Pa., 75-mm shells; Edward G. Budd Mfg. Co., Philadelphia, fuzes; Kaiser Industries, Scranton, Pa., boosters; Lukenweld Inc., Coatesville, Pa., shells.

Chicago — Recent cutbacks in the heavy ammunition program have not been reflected in important cancellations of shell steel. Reason for this is that the reductions are in proposed schedules later in the year rather than upon current output. As a matter of fact, the level now established by the cutbacks is higher than current production. In one instance, however, a tonnage of rails taken out of schedule to



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permit a corresponding increase in shell rounds has been reinstated at the rail mill.

Boston — Impact of at least 13 cutbacks on quality steel bar delivery schedules will be heavy in June with minor tonnage affected in May. Most steel required for projected increases in shell and component programs has been placed with mills, shipments to have started late this quarter and increasing each month to September-October peaks. Contract suspensions involve lines yet to get into production, but steel was on order. Cold-drawn material is prominent in some revisions, but at least 75,000 tons of hot-rolled stock is affected by two 105 mm. projects eliminated, Electric Boat Co. Victory yard, Groton, Conn., and United Shoe Machinery Corp., Lowell, Mass. Other suspensions in New England are: Time train rings for fuzes M54: Gilbert & Barker Mfg. Co., Springfield, Mass.; Perkins Machine & Gear Co., Springfield, Mass., and Holst Co., Milford, Conn.; fuze M54, Pitney Bowes Postage Meter Co., Stamford, Conn.; boosters: Brunner-Ritter Co., Bridgeport, Conn.; High Standard Mfg. Co., Hamden, Conn., and Stuart Engineering Co., Norwalk, Conn.; 81 mm. shell, Excel Foundry Co., Fall River, Mass.; 75 mm. shell, H. B. American Machine Co., Pawtucket, R. I.; Ludington-Griswold Co., Saybrook, Conn., and Van Norman Machine Co., Springfield, Mass.

In the Springfield district cutbacks affect the machining of 200,000 75 mm. shells a month by Van Norman Machine Co., while fuze ring production by the Perkins Machine & Gear Co. is reduced by 170,000, Gilbert & Barker also losing fuze rings.

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Steel Plates . . .

Plate Prices, Page 151

While plate demand has slackened in step with less shipbuilding activity pressure for deliveries to meet current needs continues heavy. Most platemakers can promise little before July as schedule gaps have been filled with most needed tonnages. Ship repair is taking an increasing quantity of plates and much material for this purpose is sought from warehouses, which in turn are seeking mill deliveries.

New York — Most plate sellers have little to offer before July, recent gaps resulting from cutbacks in the Navy program having been filled with other types of maritime work and miscellaneous rush orders. This transition has caused substitution in many cases of ordinary tank plate tonnage for special quality steel and a reduction in the profit margin of plate producers.

Most tonnage locally is going into ship work, with repair jobs taking an increasing proportion. Plates entering into ship repair at this time are in heaviest volume so far this year, it is claimed. A portion of this tonnage is moving through warehouses, which accounts in part for the continued pressure on mills from various jobbers in this district for shipments of tonnage on order. Some mills are still behind in warehouse commitments, it is said.

Boston — Slackening demand for plates has brought downward revisions in warehouse orders with mills, affecting July tonnage for the most part. Second quarter deliveries will be less than in first, and, despite some tonnage for small tankers, about 6500 tons, July-September period will also tend downward. Part of this tonnage may be rolled late this quarter. Maritime yards at Portland, Me., and Providence, R. I., are reducing forces; former drops 2500 this month and is gradually dismantling six ways at west yard. Sub-contracts for maritime ships are practically completed. June delivery is still possible with several mills, although most sheared plate units are beyond. Scattered orders for third quarter are being placed against allotments, but buying is not heavy. Reconversion of hundreds of cargo ships for troop transport is not expected to require plates in heavy volume.

St. Louis — Pressure for plates continues great although delivery promises are not as extended, current orders being scheduled for August. A new landing craft contract placed here is expected to extend promises further and perhaps delay an expected shift of some capacity from plates to sheets. Maritime Commission orders are running out, giving hope of less pressure. Cancellations have been offset by shifts to other specifications.

Philadelphia — Current quarter plate production is now estimated at about 2,000,000 tons or possibly a little higher, representing a drop of approximately 400,000 tons from the total expected a month ago. Maritime commission requirements of 600,000 tons for the quarter are off about 60,000 tons from authoritative estimates at that time, with a decidedly sharp drop expected early in third quarter. A substantial decline is also foreseen in overall requirements in third quarter. Railroad equipment needs will bolster the situation to some extent but will fall far short of offset-

ting declines in other directions. At present most producers quote July delivery, however, so that the general decline in third quarter should not be too highly precipitous at the start of that period unless there are further important cancellations, which are a possibility under the circumstances.

Meanwhile plate tonnage is being shifted from strip mills as fast as the labor situation permits. Monthly strip-plate production of about 100,000 tons is expected to be further substantially cut by the end of second quarter. Steel has been distributed for the ten C-E-type cargo ships recently formally announced as placed by the Netherlands Purchasing Commission with Sun Shipbuilding & Dry Dock Co., Chester, Pa. Steel was first tentatively placed for three ships several weeks ago, followed recently by contracts for the remaining seven ships. Orders for this now are firm. It is believed that work on the 40 tankers recently considered for cancellation by the Maritime Commission will go ahead. Twenty of these are on schedule at the Sun Shipbuilding yard.

Chicago — Plates are the most comfortable of all steel products, a direct reflection of the declining demand of naval and maritime requirements. Furthermore, the recent cutbacks in both Navy and maritime contracts has created open space in early months which some mills are attempting to fill by aggressive selling to maintain production up to established directive. Many consumers have been aided by this open tonnage.

Tubular Goods . . .

Tubular Goods Prices, Page 151

New York—Merchant pipe distributors here are still pressing mills for tonnage, on which deliveries in many cases are several weeks overdue. Distributors' stocks are still being drawn upon for certain military requirements abroad, as well as for prefabricated housing units to be set up in England and France. Meanwhile, heating and plumbing requirements in the district are light, reflecting lack of sizable building projects.

Butt and lap-weld pipe are being quoted by mills for June and July shipment, with deliveries on general run of seamless pipe more extended, reflecting shell work in various important instances.

Various curtailments in ship requirements are cutting in on potential demand for boiler tubing, although there is enough work on hand and scheduled to go ahead to supply producers with fairly substantial backlogs for the remainder of this year. Backlogs in boiler tubing will be further bolstered by railroad locomotive requirements. Locomotive builders already have heavy order books, with still much additional business in prospect.

Wire . . .

Wire Prices, Page 151

Boston — Cutback revisions are not yet major factors in wire mill schedules but reductions in some aircraft programs are interrupted, as an indication of what may be ahead as effects filter down through hundreds of subcontractors. While bookings of fine wire are heavy and exceed shipments opinion gains that backlogs will be subjected to major reshuffling soon. Meanwhile, pressure for finished wire in fine and intermediate sizes is unabated, including aircraft, with some mills behind schedule. Demand continues centered heavily in high carbon and deliveries on coarser sizes of low carbon are easy. Buying of screw stock and stapling wire is also brisk. Awards have been rescinded for most of 950 tons of bright steel wire shoe nails, by the quartermaster, Boston, and about 220 tons of 8/8 and 9/8-inch heel nails are bought, orders going to Independent Nail & Packing Co., Bridgewater, Mass., L. F. Grammes & Sons Inc., Allentown, Pa., and Charles F. Baker Co., Framingham, Mass. North & Judd Mfg. Co., New Britain, Conn., will supply 2,400,000 steel buckles for combat service boots.

New York — Space is sought for large quantities of wire rope for delivery in first and second quarters next year and production of rope wire holds at peak under continuing directives. Pressure for assault, field and signal wire is maintained, also for tire bead wire. The latter is expected to remain heavy into postwar days. Slackening in shipbuilding will eventually affect rope, although not yet apparent, while the war trend will influence field wire. There are a few diversified cutbacks, with more expected, but some believe that transition to reconversion will be expedited, as indicated by plans for the automotive industry, in which a heavy pentup demand for wire is assured. Most

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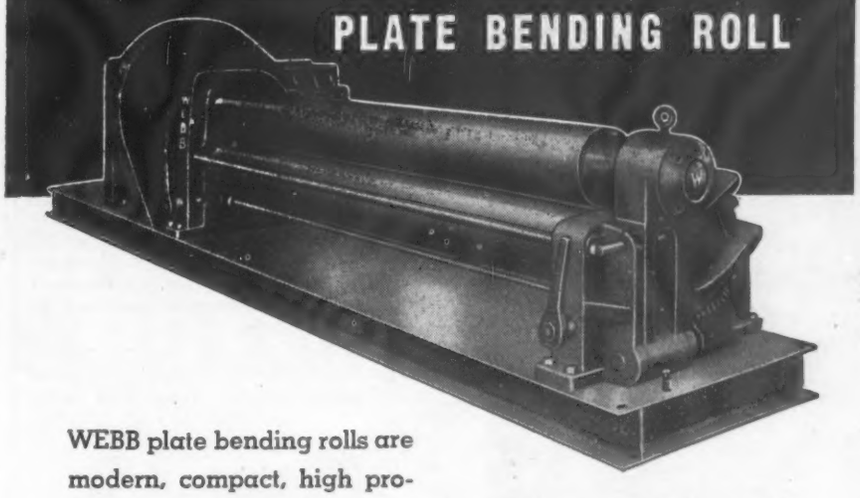

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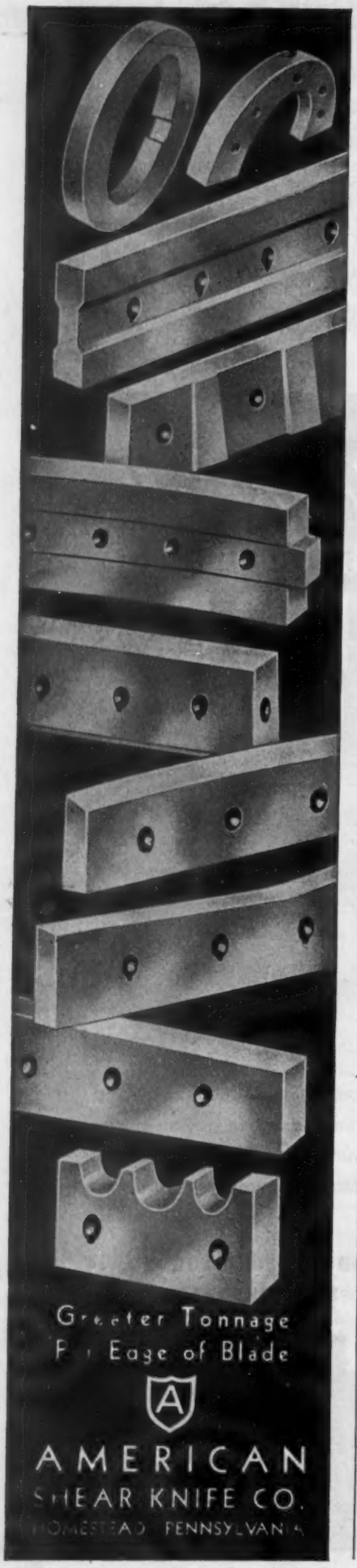

mills are in third quarter and some beyond on music spring wire. The volume finding its way into civilian products is small. Demand for merchant products, notably nails, is strong, with production held down by directives for some. For all-metal cans approximately 800 tons of carbon steel wire for handles and keys are required for this quarter.

Tin Plate . . .

Tin Plate Prices, Page 151

Pittsburgh — Labor problems, including slow-down troubles and a strike of sorting workers at both Chicago and Pittsburgh plants of United States Steel Corp. subsidiaries, reduced output of tin plate in April to below March. As a result, deliveries on second quarter commitments are somewhat behind schedule and there may be a fairly large carryover into third quarter. Third quarter bookings represent virtual capacity operations for that period on the basis of present tin and steel allotments. The second quarter carryover would of necessity force out some third quarter business books unless there can be an increase in available tonnage. There has been no disposition yet on the part of the War Production Board to increase available tonnage of either steel or tin for third quarter, or later, production. It now seems doubtful that even declaration of V-E Day would make any appreciable dent in the overall flat-rolled sitution. There is no question that the advent of V-E Day will result in heavier demand for tin plate but the outlook for additional supply is not bright.

Chicago — Can manufacturers report their low supply of tin plate as serious, as demand for food containers is increasing and production of tin plate is restricted by WPB directive. Production at Gary sheet and tin mill of Carnegie-Illinois Steel Corp. has returned to near normal with striking workers on the hot picklinig lines having returned to their posts. Car supply continues to improve, permitting district tin plate makers to ship not only current output but to make inroads on material piled up in recent weeks when cars were short.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 151

New York — With a 20 per cent reduction in second quarter quota, and with incoming orders still in excess of shipments, bolt and nut makers report that their delivery schedules have extended 25 to 30 per cent within the last 30 days. Demand continues highly diversified, although recent business has included an exceptionally large tonnage for prefabricated housing units for England and France, particularly the former, and for prefabricated hangars. On some sizes bolt and nut makers are now booked solidly for 16 to 18 weeks in the future.

Meanwhile, and despite the recently announced cutback of 10 per cent in the 1945 shell program, bolt and nut makers still find bar deliveries exceedingly tight. An easing due to this readjustment in the shell program will eventually develop, especially with regard to the more extended delivery promises, but to date, according to some leading producers, there have been no important changes in delivery schedules. They

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assert they will have difficulty obtaining promises of shipments before fourth quarter. An important exception is in bessemer steel, which is available for August shipment.

Rails, Cars . . .

Track Material Prices, Page 151

New York—Apart from the relatively moderate list of cars recently noted as pending for the Bangor & Aroostook, little domestic car business is being figured. Most interest at the moment is being centered on prospective work for export, especially the 30,000 miscellaneous freight cars for France, on which formal inquiry is expected shortly through the War Department.

Substantial lists of cars for overseas still dominate interest here. Report is that 10,000 freight cars will be required for Belgium and 6000 for India, the latter appearing the more imminent. The 6000 cars for India are in addition to 8000 placed several months ago in Canada and 4500 placed in this country. Of those to be built in Canada the Canadian National Car Co. was awarded 2400 and the Canadian Car & Foundry Co. 5600. Of the 4500 placed in the United States Magor Car Co., Passaic, N. J., received 1000 box and 1000 gondolas, Mt. Vernon Car Mfg. Co. 1500 box and Ralston Car Co. 1000 gondolas.

It is understood that the cars for France, Belgium and India will be placed eventually through the War Department, under auspices of the Foreign Economic Administration. The War Department is inquiring for 1300 cars, involving several types for its own use.

Structural Shapes . . .

Structural Shape Prices, Page 151

New York — The largest structural award here in some weeks involves 6000 tons for a 31-story building for the Standard Oil Co. of New Jersey for erection after the war in Rockefeller Center, West Fifty-second street. The steel was placed by John W. Harris Associates Inc., 30 Rockefeller Plaza, general contractor, with Bethlehem Steel Co., Bethlehem, Pa.

Philadelphia — Interest in the structural field here is centered on the 1000-ton storehouse for the Philadelphia Navy Yard, on which bids have just been closed. This is one of the most attractive jobs coming out in this district in some time. Structural demand otherwise is light, with fabricators generally having little on books. Shapes, however, still are being quoted for August delivery, indicating a substantial quantity of ship and shell work on hand.

Boston—Close to 2500 tons of shapes wanted for July by a Maine shipyard will be distributed by WPB; mill schedules for some sizes are in August. Material is for small tankers and about completes requirements in sight for maritime yards. Except for several special welding contracts, treadway bridges and heavy outboard motor supports for landing craft, new contracts are scarce and inquiry light. More tonnage has been involved in suspensions than has been awarded of late; most of this has affected shops outside this area, tonnage placed by district contractors.

Chicago — District structural fabricators are busy, and those not having jobs covered by directives experience trouble getting material. Chief demand

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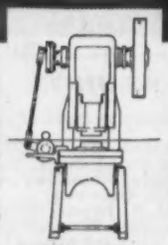

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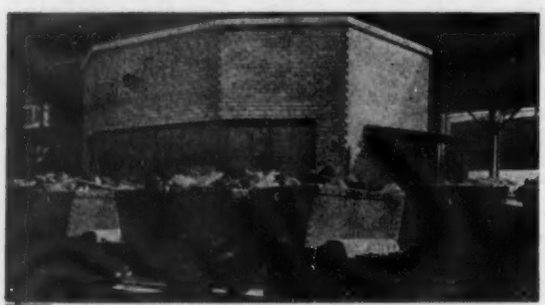

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for construction is for new or expanded war plants. Some relief was afforded by stopping of construction of shell and tank plants announced two weeks ago. More discussion is heard of construction to be undertaken as soon as war demand for steel subsides.

Pig Iron . . .

Pig Iron Prices, Page 153

Conditions in the pig iron market are little changed, supply being sufficient to meet needs and shipments are made regularly. Lack of labor holds down demand from foundries which are unable to operate to capacity or to take all the castings business offered. In some instances producers have piled small tonnages and some melters are able to increase inventories slightly.

New York — While pig iron shipments are forthcoming in sufficient volume to sustain the foundry melt in this district at about the same rate as the past several weeks, consumers report they have little margin on which to work. In few cases do foundries appear to have more than 30 days supply and in various instances they have less. The situation is further complicated by continued shortage of cast scrap. Most foundries are now using a greater ratio of pig iron to scrap than they have in several years, it is said.

In view of this situation, Buffalo furnaces continue to ship by rail into this district, not availing themselves of the state barge canal which recently opened its 1945 season. Some Buffalo producers claim it will be at least June, if not later, before stocks will be sufficiently adequate to permit them to use the slower means of transportation and even this is not too certain, they claim.

Buffalo — Releases against second quarter pig iron bookings are slower than expected. One seller reports leading consumers holding inventories below the 30 days allowed by WPB. Foundry operations continue at the limit of manpower, with large unsatisfied castings inquiry. Limit to inventory has curtailed shipments for the present and one producer is piling some iron.

St. Louis — For the first time in many months large melters have begun to build small pig iron reserves, although foundries are in tight position. Better scrap supplies have permitted some melters to reduce consumption of pig iron. The principal producer in this area was down for a few days because of a break in a trans-Mississippi gas main which affected the rolling mill which takes its entire output.

Philadelphia—An acute situation continues in basic iron. Outside producers who were being relied on to fill gaps occasioned by suspension of No. 2 stack at Swedeland, Pa., for repairs have been unable to meet demand because of recent labor difficulties in coal mines. This applies to furnaces in both the western Pennsylvania and Birmingham districts, where a number of stacks still are down. The situation is further complicated by the fact that the Swedeland furnace will not be blown in as soon as expected. While it will not have to be completely relined it is evident that it will not get into production much before the middle of May, probably first producing foundry iron for a week or so before shifting to basic. This means resumption of basic shipments late in May. Meanwhile at least two

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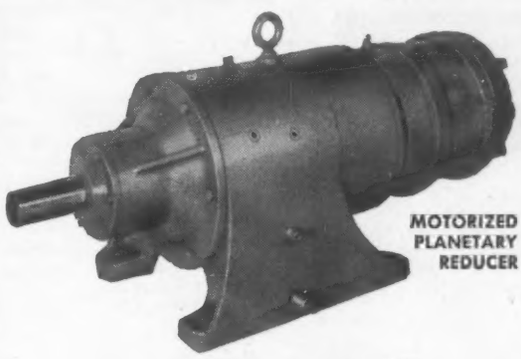

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large consumers are far from sure they will be able to maintain steel production.

Pittsburgh — Pressure for deliveries has increased because of the tonnage lost through coal strike. Inventories of iron now are at record low and merchant sellers here report order books full through second quarter. In all probability the tight situation will continue beyond the end of second quarter inasmuch as demand from regular customers continues to increase and there is no apparent break in sight in cast scrap. Steel operations during the past week were hampered by lack of iron since the coal strike had resulted in a complete depletion of coke stocks and there was a lag of several days before adequate supplies could be built up and permit blast furnaces to return to active operation. This situation has also affected merchant iron coming into this district from the Cleveland area and has caused a reduction in shipments to customers of Ohio blast furnaces.

Cincinnati — Foundries are pressing for shipment of pig iron, hoping to build inventories. Many melters have supply for 10 days or less, and few have reached the 30-day maximum. The lag in shipments is more pronounced on northern iron. Meanwhile the melt remains almost constant under lack of manpower for expansion.

Boston — Slight improvement in supply of foundry grades from outside furnaces has brought more consumers close to the 30-day inventory limit, which for some is considered sufficient in view of possible war contract revisions. With the Everett furnace husbanding its remaining reserves and Buffalo shipping about all possible to this area, general situation remains tight. This is likely to continue at the current rate of melt or until additional iron is available from other points which, due to strong demand, has not been too active in New England tonnage.

Chicago — Supply and demand of pig iron are still nip and tuck. Foundries have difficulty in building inventories up to the allowable 30-day level, and suppliers are called upon to rush shipments to provide metal for proper mixes. Manpower shortage in foundries has improved, but still is a deterrent. A feeling exists that war production cutbacks soon may relieve demand for castings somewhat. Carnegie-Illinois Steel Corp. has blown out its No. 6 blast furnace at Gary for rebuilding. Thus three of the district's 41 stacks are down, two of which will be inactive for some time.

Scrap . . .

Scrap Prices, Page 154

Scrap supply is sufficient to meet needs, though scarcities exist, notably in cast grades, and occasional allocations are used to send material to points where scarcity develops. Lack of labor to process accumulations holds back shipments in some cases. Movement of material by lake from the Duluth area and by barge canal from the East to Buffalo is helping the situation in that area. Buying is being done cautiously in view of the European military situation.

Philadelphia — Turnings continue in heavy supply and in view of cutbacks in the shell program, which affect the future outlook, the market is decidedly

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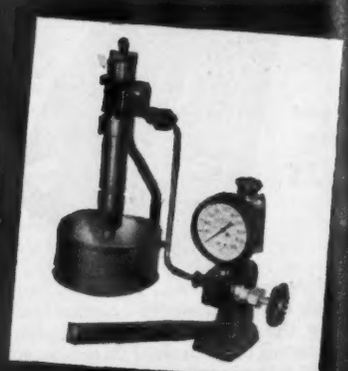

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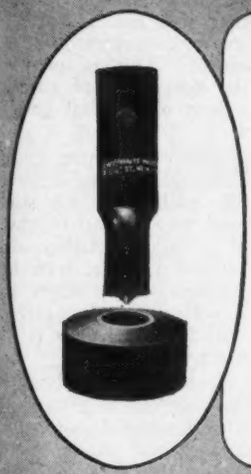

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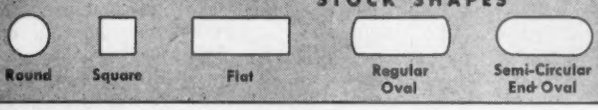

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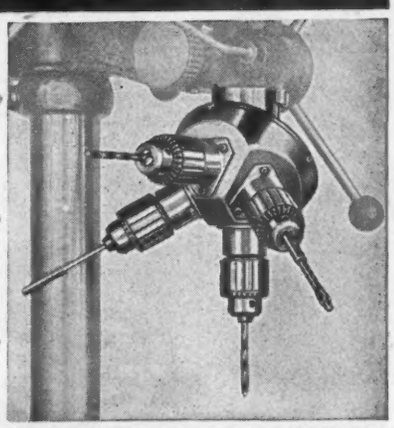

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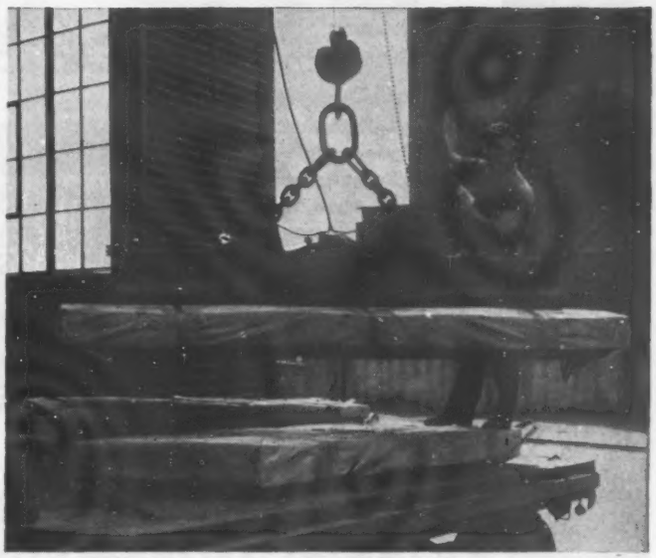

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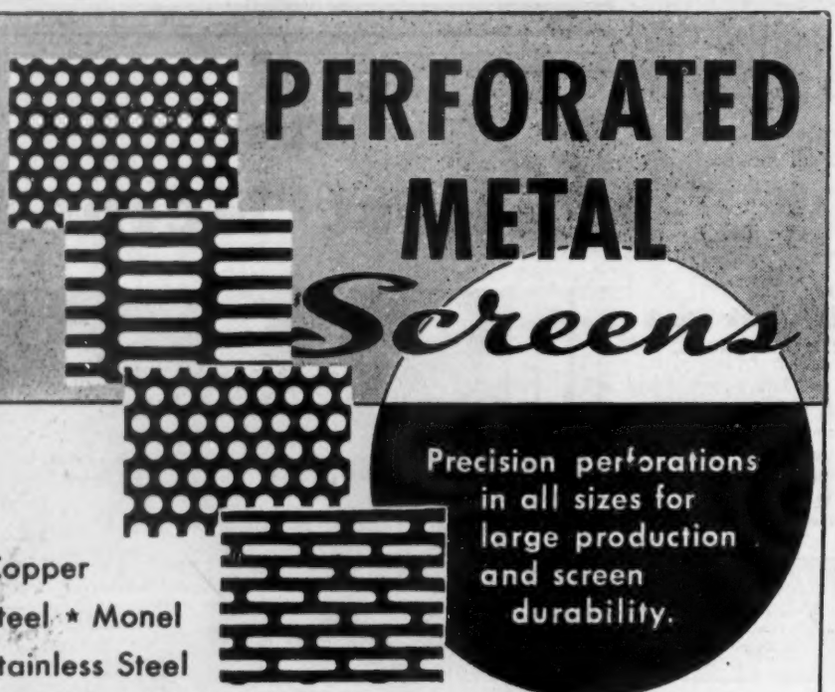

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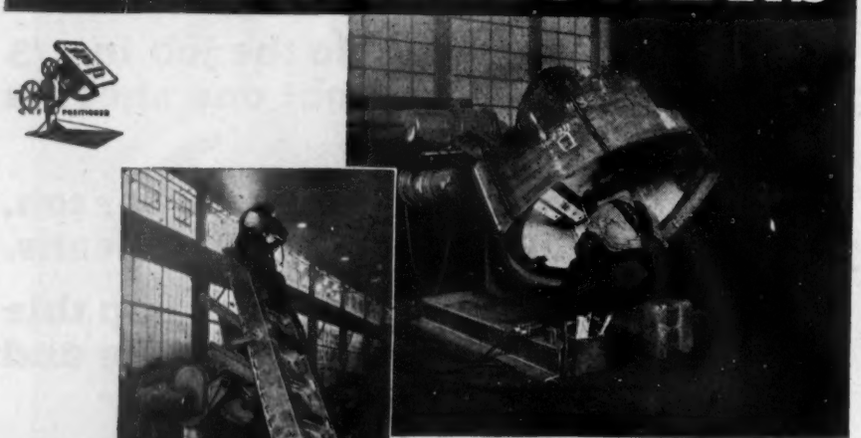

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weak and an early drop of possibly $2 per ton would not be surprising. Shipments are being held up at two or three points. Heavy melting steel is moving freely and the market is firm in spite of disposition of most consumers not to order too far ahead. This is ascribed principally to the possibility of sudden end of the European war. Cast grades continue scarce.

Pittsburgh — Scrap continues strong in all grades. Demand for turnings is more active, with some sales for short turnings and mixed borings and turnings reported at full ceiling, probably due to increased pressure for pig iron because of the shortage arising from the coal strike. All mills here are actively in the market and the firm tone is expected to continue indefinitely.

Boston — Consumers of steelmaking scrap are holding shipment to specification, rejecting or forcing discounts on alloy light scrap. Good grade heavy melting is wanted in this area, although there is some easing of pressure from Pennsylvania. Spotty weakness in machine shop turnings and busheling, frequently hinged to quality and shipping point, has not spread to other grades. Supplies are slightly heavier, including cast, although improvement in the latter is limited. Watertown arsenal is closing this week on 300 tons of moly turnings.

St. Louis — Scrap deliveries are improving as dealers at remote points hurry to fill orders before melters cancel as a hedge against reduced government requirements. Shipments are better from all points except flood and storm areas in Arkansas, Oklahoma and northern Texas. Mill reserves are better and most are not far from the 45-day supply asked by WPB. There is evidence many melters are reducing purchases to maintain fluid position, some allowing orders to run out. Prices are at ceilings except for turnings.

Cincinnati — Tonnage buying of scrap iron and steel is absent and there is a hint that consumers have become conservative as V-E Day approaches. Heavier grades take ceiling prices but lack of ready outlets suggests some weakness not apparent previously. Foundries are still avid for material. Yard stocks tend to expand, but dealers shy from too much material requiring preparation while labor is short.

Los Angeles — No. 1 heavy melting steel from shipyards is still moved east and indicates continuance of prices below ceilings. Manpower shortage for collection and preparation still limits volume of material. Prices continue at $2 to $3 below ceiling. A dribble of battlefront scrap from the Pacific is reaching port but is estimated at less than 2 per cent by local WPB officials and has no effect on the market.

Buffalo — Scrap buying continues brisk as mills are willing to place all orders dealers can handle on a 30-day basis. A leading melter continues to use material from stockpiles, which are low in spite of boat arrivals. A second cargo of 5000 tons has arrived by lake from Duluth and the first scrap fleet by the barge canal is on the way. Lake scrap is mainly railroad material, valuable to balance large quantities of turnings coming from local war plants, estimated at 60 per cent.

Seattle — Due to labor shortage the scrap situation is becoming critical. Ample material is available but manpower

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cannot be found to prepare it, as dealers cannot compete in wages with other war industries. Mill facilities for scrap preparation also suffer from lack of workers. The Canadian government has stopped scrap exports to the United States, all scrap being shipped to eastern Canada. Considerable tonnages have been coming by rail from British Columbia. Appeals to manpower authorities have had no result. Rolling mill operators fear conditions will become worse and increasingly retard production.

Chicago — Development here last week was the further tightening for time being at least, of blast furnace material. An important mill purchased mixed borings and turnings and short shoveling turnings for $12.50, thus lifting the price of these grades sharply above the range which had been prevailing. Cast iron borings have assumed the same level. However, prices still are $1.25 to $3.25 below ceilings. Machine shop turnings remain weak at $9 to $9.50. Open-hearth material is in good demand and mills are taking it as rapidly as offered, but quantities are not adequate to afford much help in attainment of the agreed 45-day inventory minimum.

Warehouse . . .

Warehouse Prices, Page 152

New York — Inquiry for steel from warehouse continues heavy and total sales volume is limited by inventory. Among major products, only plates are inclined to lag. Both carbon and alloy bars are in strong demand; on larger carbon sizes stocks are depleted. Nails are among the tightest products with distributors and with reduction in warehouse load expected no early improvement is indicated, although orders are in for replacement into second quarter, next year. Even odd sizes of hot carbon sheets, which have lagged behind, are cleaned out.

St. Louis — Warehouse stocks continue low, material moving out almost as rapidly as received. Tonnage can be replaced only as fast as sold, forcing a three to nine months lag in which changed demand cannot be anticipated. Labor shortage increases difficulty of getting out shipments.

Nonferrous Metals . . .

Nonferrous Prices, Page 155

New York — Decline in demand for copper, May delivery, will halt withdrawals from stockpile, which have been heavy since the first of year. Domestic production and foreign arrivals are expected to meet requirements. Reserve stocks have gone to slightly under 200,000 tons, nearly halved in four months. Slackening orders for copper are due in part to cutbacks in ammunition and navy building program, but also to heavier inventories held by consumers; record-breaking shipments of March, 218,488 tons, will still be an inventory factor at the end of April.

Under reverse lend-lease British will supply this country with 42,000 tons Rhodesian copper this quarter, in addition to 30,000 tons under the same terms, first quarter. Second quarter tonnage is included in the 175,000 tons asked of the British during the remainder of this year.

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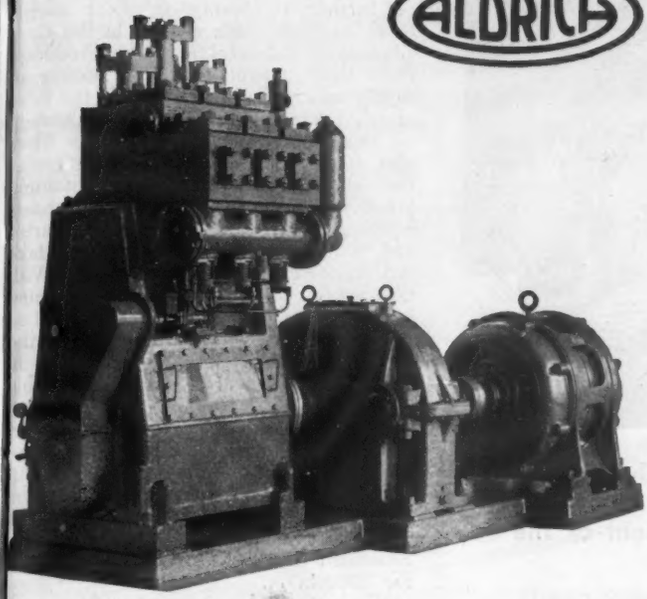

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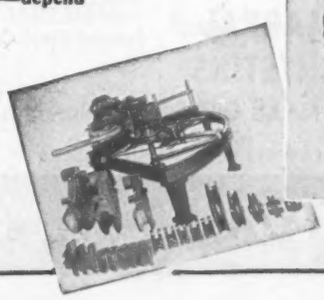

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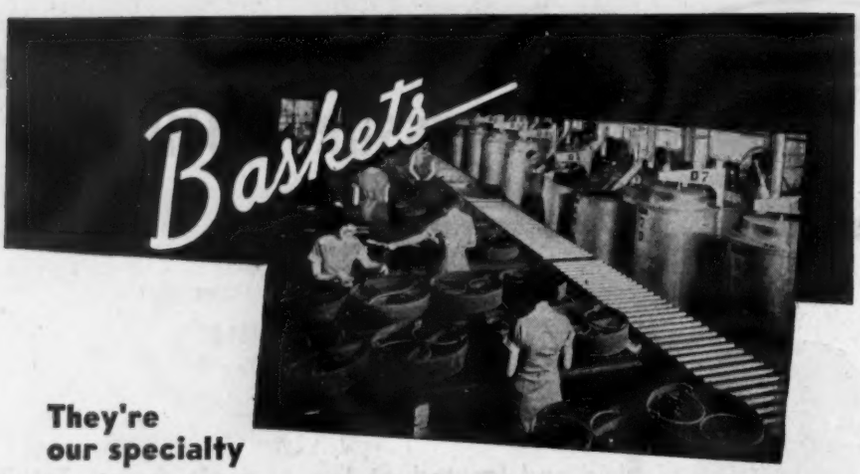

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Canada . . .

Toronto, Ont. — With the exception of further tightening in steel supply there has been little change in the Canadian iron and steel market. Producers state that demand is far in excess of supply and mills are working to the limit of labor supply, which is approximately 90 per cent of rated capacity. They also point out that only the most essential civilian consumers are obtaining deliveries of steel. On bars and sheets bookings extend into fourth quarter and while producers continue to take orders, deliveries are uncertain. With the greater part of production going into the war effort it is stated that when big cutbacks develop at the close of the war in Europe, supplies of steel in larger volume will be made available to civilian consumers. Already there have been cancellations of United States contracts with Canadian firms but these have made little difference to the situation, partly due to the fact that the United States has been supplying a large part of the steel that goes into American war materials production in the Dominion.

While there has been some improvement in demand for steel plates on shipbuilding account, it has not been sufficient to create any serious shortage in supply and Canadian plate producers are accepting orders for delivery in July.

Scrap iron and steel receipts continue to improve with larger tonnages from rural districts. Steelmaking scrap is said to be appearing in sufficient volume to take care of current requirements but so far this year consumers have not been able to add to their accumulation. Dealers are again establishing yard stocks for future sorting and shipping. While there has been betterment in supply of cast scrap and stove plate, receipts are not yet sufficient to take care of all demands, with the result that a number of melters continue to fill in with pig iron.

Iron and steel production in Canada in February was slightly lower than that for January, entirely as a result of the shorter month. On a daily basis production of both pig iron and steel was up about 300 tons over the preceding month. Production for the first two months of this year was higher than that for the corresponding period of 1944. During February nine blast furnaces out of a total of 14 were blowing. Comparative production figures in gross tons follow:

	Steel ingots castings	Pig iron	Ferro-alloys
Feb. 1945 ...	250,460	149,487	13,402
Jan. 1945	268,722	155,969	12,130
Feb. 1944 ...	229,852	141,878	14,720
2 Mos. 1945..	519,186	305,456	25,532
2 Mos. 1944..	472,038	274,006	31,215
2 Mos. 1943..	452,596	254,567	36,649

Steel in Europe . . .

London — (*By Radio*) — A small tonnage of heavy steel sections has been placed for export in Great Britain and others are expected to follow soon. Sheet demand dominates the market, with bookings into fourth quarter. Special grades of steel are quieter. Fuel is scarce and difficult to obtain.

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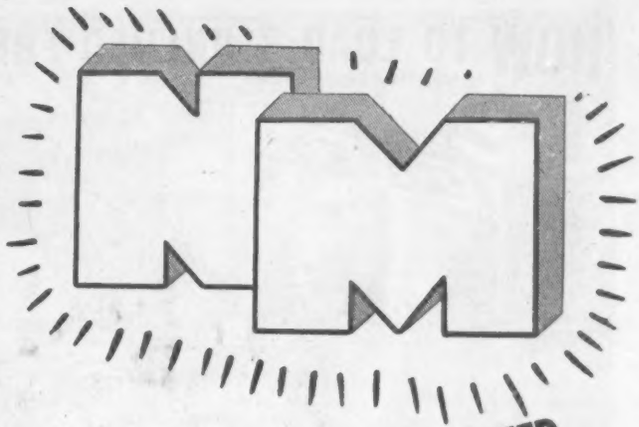

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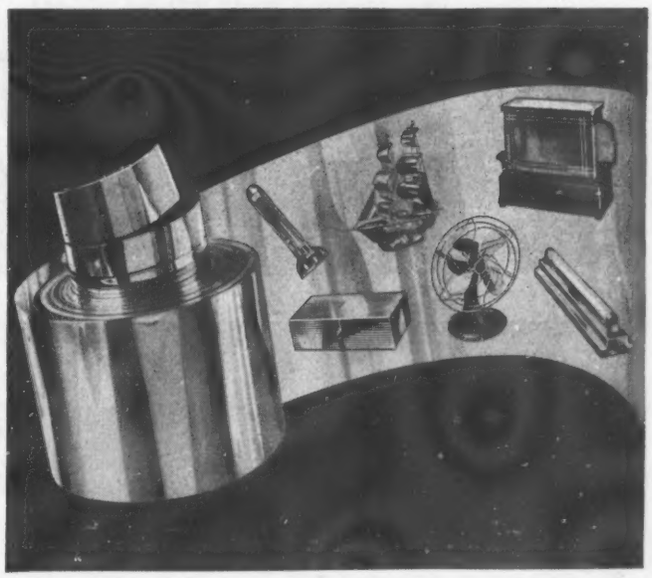

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Charles H. Loth, General Manager

Bethlehem, Pa.; bids March 14.

1600 tons, storehouses, North Island, Calif., for government, to Bethlehem Steel Co., Bethlehem, Pa.; bids April 9.

1570 tons, 1945 bridge requirements, various locations, for Chicago, Rock Island & Pacific railroad, 1327 tons to American Bridge Co., Pittsburgh, 157 tons to Bethlehem Steel Co., Bethlehem, Pa., and 86 tons to Duffin Iron Works, Chicago; bids March 1.

350 tons, apartment building, Caracas, Venezuela, to Bethlehem Fabricators Inc., Bethlehem, Pa.

260 tons, factory addition, Midland Steel Products Co., Detroit, to R. C. Mahon Co., Detroit.

227 tons, sheet piling, pier, Hammond, Ind., for city, to Inland Steel Co., Chicago, Great Lakes Dredge & Dock Co., Chicago, contractor; bids March 5.

200 tons, manufacturing building addition and alterations, Louisville, Ky., for Curtiss-Wright Corp., to Taylor & Gaskin, Detroit.

STRUCTURAL STEEL PENDING

590 tons, pile driver leads, various locations, for Bureau of Yards and Docks, U. S. Navy, Chicago; Ingalls Iron Works, Birmingham, Ala., low bidder; bids April 12.

420 tons, boiler house, Lake Charles, La., for M. W. Kellogg Co.

300 tons, sheet piling, bridge protection, Indiana Harbor, Ind., for New York Central railroad.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1480 tons, veterans hospital, Tomah, Wis., for U. S. Veterans Administration, to Joseph T. Ryerson & Son Inc., Chicago; Gust K. Newberg Construction Co., Chicago, contractor; bids April 3.

750 tons, water works, Louisville, Ky., for city, to American Builders Supply Co., Louisville; S. N. Nielsen Co., Chicago, contractor; bids April 3.

500 tons, tire plant, Ottawa, Ill., for Inland Rubber Corp., to Ceco Steel Products Corp., Chicago; Darin & Armstrong Inc., Detroit, contractor; bids April 10.

100 tons, bridge, Route 13, Lawrence county, Illinois, to Laclede Steel Co., St. Louis.

REINFORCING BARS PENDING

500 tons, veterans hospital, Sioux Falls, S. D., for U. S. Veterans Administration; bids May 22.

250 tons, test building, General Electric Co., Schenectady, N. Y.

112 tons, engineering laboratory building No. 324, Great Lakes Naval Training Station, Great Lakes, Ill.; Peter Hamlin Construction Co. Inc., Chicago, low on general contract; bids April 10.

PIPE . . .

CAST IRON PIPE PLACED

300 tons, 8-inch for Portland, Oreg., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

800 tons, various sizes, for West Slope water district, Portland, Oreg.; Oscar Butler & Son, Portland, general contractor.

500 tons, 8-inch, Bangor, Wash. navy depot improvement; Sound-Kiewit Co., Seattle, low for general contract, $2,684,105.

RAILS, CARS . . .

RAILROAD CARS PLACED

Consolidated Railroads of Cuba, 250 fifty-ton steel box cars, to Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.

RAILROAD CARS PENDING

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CONSTRUCTION AND ENTERPRISE

OHIO

AKRON, O.—Carlson Mfg. Inc., has been incorporated with $500 capital and 250 shares no par value to manufacture sheet metal products by Dale S. George, 601 East Crosier street, and associates.

AKRON, O.—Emmet Machine & Mfg. Inc., 524 Winegertner avenue, has been incorporated with $500 capital and 300 shares no par value to operate a machine shop and foundry, by George Emmet, Box 243, East Akron, O., and associates.

AKRON, O.—Excelsior Stamp Works, 42 East Mill street, has been incorporated to manufacture steel, plastic and rubber marking tools and devices, with $600 capital and 200 shares of $100 par value, by Harry F. Kolar, 42 East Mill street, and associates.

CANTON, O.—Timken Roller Bearing Co., G. A. Bessmer, purchasing agent, 1835 Dueber avenue, will build a two-story office addition 16 x 70 feet, costing about $17,000.

CINCINNATI—Fisher Body Division of General Motors Corp., T. P. Archer, general manager, has bought a site near Hamilton, O., for erection of an automobile body stamping plant.

CLEVELAND—Cleveland Hobbing Machine Co., 1311 Chardon road, is having plans made for a one-story addition costing about $20,000.

CLEVELAND—Ohio Midwestern Corp. has been incorporated with 500 shares of $100 par value, 1000 shares no par value and capital of $500 to manufacture machinery and parts.

CLEVELAND—Cleveland Manufacturers Products Inc. has been incorporated to manufacture iron, steel, plastic and other metal products, by Henry J. Williams, 811 Park building, and associates, with $500 capital and 250 shares no par value.

YOUNGSTOWN, O.—H. W. Sittig Tool & Forge Works Inc., 828 Tod avenue, has been reincorporated to manufacture metal products, with $10,000 capital and 250 shares no par value, by M. L. Williams, 3700 Oakwood avenue, and associates.

CONNECTICUT

BRIDGEPORT, CONN.—Auto-Ordnance Co., R. Maguire, president, is having plans prepared for a plant addition on Railroad avenue, to cost over $40,000.

FAIRFIELD, CONN.—Town Clerk, Town Hall, plans incinerator and town garage, to cost about $300,000. Keis & Holroyd, 257 Broadway, Troy, N. Y., are engineers.

PENNSYLVANIA

McKEESPORT, PA.—National Tube Co., Frick building, Pittsburgh, has let contract to Mellon Stuart Co., 210 East Parkway, Pittsburgh, for a one-story 150 x 675-foot addition and alterations, estimated to cost $1 million, with equipment $2,800,000 additional.

PHILADELPHIA—Chrome Gauge Co., R. N. Hirsch, general manager, 3217 Frankfort avenue, is having plans prepared by C. L. Gaspary, 1701 Walnut street for a plant addition costing about $40,000.

MICHIGAN

DETROIT—Carboloy Co. Inc., 11177 East Eight Mile road, plans a one-story plant addition to cost about $350,000.

DETROIT—Ultra-Lap Machine Co., 247 McDougall, has been incorporated with $100,000 capital to conduct a metal lapping and finishing business, by W. C. Devereaux, 1367 Franklin street.

EAST DETROIT, MICH.—Traynor Inc., 23657 Schoenherr road, has been incorporated with 1000 shares no par value to manufacture tools, dies, jigs and mechanical parts, by Wilbur F. Traynor, 15067 Ward, Detroit.

FLINT, MICH.—R. & G. Motor Sales Inc., 1303 North Saginaw street, has been incorporated with $60,000 capital to manufacture parts and accessories, by Larry Redford, 321 North Hamilton street, Saginaw, Mich.

HIGHLAND PARK, MICH.—Knight Industries Inc., 505 Murphy building, has been incorporated with $100,000 capital to operate tool and die shops, by William Knight, 16922 Griggs, Detroit.

NEW BOSTON, MICH.—New Boston Tool & Mfg. Co., 19182 Huron River Drive, has been incorporated with $50,000 capital to manufacture machinery, tools, jigs and parts, by H. Strimpel, same address.

SAGINAW, MICH.—Saginaw Malleable Division of General Motors Corp. has let contract to Austin Co. Inc., 429 Curtis building, Detroit, for design and construction of a brick, steel and reinforced concrete plant to cost about $238,000.

STURGIS, MICH.—G. & G. Industries Inc., R.F.D. No. 2, has been incorporated with $99,500 capital to manufacture tools, machinery and equipment, by Forrest L. Grim, same address.

ILLINOIS

BELVIDERE, ILL.—National Sewing Machine Co. plans plant addition as soon as materials are available.

CHICAGO—Harrison Iron Works, 401 North Paulina street, has bought 15 acres at Lawndale avenue and Thirty-fourth street, on which it will erect a drop forge plant and move its operations there.

GENEVA, ILL.—Burgess-Norton Mfg. Co. plans one-story plant addition on South street.

KEWANEE, ILL.—Kewanee Mfg. Co., manufacturer of steel truck bodies and hoists, will let contract soon for a plant to cost about $100,000. Morton L. Periera, 100 West Monroe street, Chicago, is architect.

LOCKPORT, ILL.—Texas Co., Lockport, has let contract for catalytic cracking plant to M. W. Kellogg Co., 225 Broadway, New York, at estimated $15 million.

INDIANA

COLUMBIA CITY, IND.—Board of public works, F. Dillman, secretary, plans sewage treatment plant to cost about $150,000. Phelps & Peck, Brinckmann building, Michigan City, Ind., are consulting engineers.

MARYLAND

BALTIMORE—Friez Instrument Division of Bendix Aviation Corp., Taylor avenue, is building a one-story addition 40 x 200 feet.

BALTIMORE—Joseph O. Danko, owner of Danko Pattern & Mfg. Co., 31 East Lee street, maker of metal and wood patterns, plans construction of an aluminum foundry at 4810 East Wabash avenue, Arlington, to be operated independently under a name not yet determined.

BALTIMORE—Crown Cork & Seal Co., Eastern avenue and Kresson street, will build a machine shop addition at Barclay and Oliver streets, one story, covering 11,000 square feet. Company also plans power plant at its Highlandtown plant.

BALTIMORE—United States Industrial Chemicals Inc., Curtis Bay, will build a boiler house addition 60 x 100 feet.

TENNESSEE

CHATTANOOGA, TENN.—Pennsylvania-Dixie Cement Corp. plans plant improvements to cost about $450,000.

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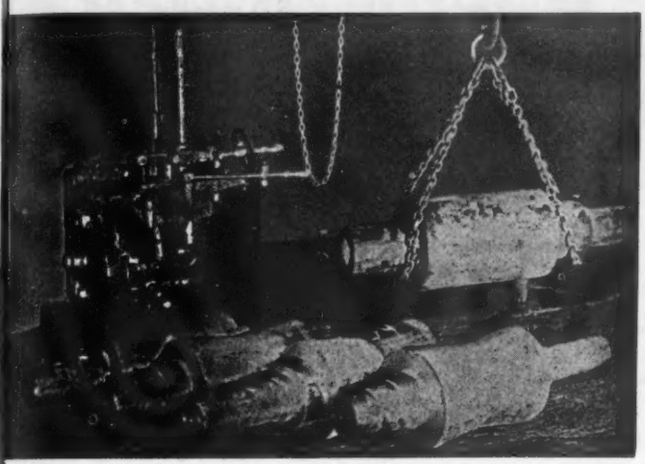

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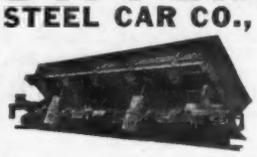

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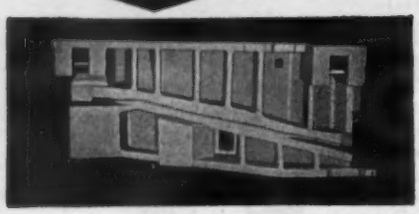

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Strenes METAL

KNOXVILLE, TENN. — Sanford-Day Iron Works plans plant addition to cost about $60,000.

NASHVILLE, TENN.—L. S. Johnson Tool Co. plans one-story plant addition 80 x 120 feet on Douglas avenue.

WISCONSIN

ANTIGO, WIS.—Antigo Milk Products Co-operative is having plans prepared by Oppenhamer & Obel, Green Bay, Wis., for a one and two-story 63 x 103-foot power house.

EAU CLAIRE, WIS.—National Pressure Cooker Co., 1515 Ball street, is having plans prepared by Magney, Tusler & Seter, 202 Foshay Tower, Minneapolis, for one and two-story plant additions, to cost about $100,000.

FOND DU LAC, WIS.—Damrow Bros. Co., manufacturer of creamery machinery and equipment, will build a one-story plant 120 x 200 feet. F. J. Stepnoski & Son are architects.

GREEN BAY, WIS.—Wisconsin Public Service Corp., Bellin building, A. G. Carson, chief engineer, is making plans for a power plant addition to cost about $2,800,000.

MARINETTE, WIS.—Kargard Boat & Engine Sales will build a one-story boatbuilding plant 80 x 240 feet.

MILWAUKEE—Lincoln Tool & Mfg. Co. has been incorporated to manufacture tools, gears, etc., by Harry F. Gorski, 4016 South First place, and associates.

MILWAUKEE—Perfex Corp., manufacturer of engine cooling radiators, has let contract to Permanent Construction Co. for a one-story plant addition at 500 West Oklahoma avenue.

MILWAUKEE—Precision Shaped Wire Co. has been incorporated by Joseph E. Kops, 2704 North Third street, and associates.

NEENAH, WIS.—Neenah Foundry Co. has let contract to Fluor Bros. Construction Co., Oshkosh, Wis., for a one-story addition.

WAUSAU, WIS.—Marathon Battery Co. plans one-story plant addition. George Foster Jr. is architect.

WEST ALLIS, WIS.—Motor Castings Co., 1323 South Sixty-fifth street, has let contract to Uecker-Samp Co., 1217 North Seventy-first street, Milwaukee, one a one-story foundry addition.

WEST ALLIS, WIS.—Blackhawk Mfg. Co., manufacturer of hydraulic jacks, has let contract to Klug & Smith Co., Milwaukee, for a one-story plant addition.

WISCONSIN RAPIDS, WIS. — Consolidated Water Power & Paper Co. plans a one-story addition 63 x 86 feet.

MINNESOTA

DEER RIVER, MINN.—Chippewa Wood Processing Association, George H. Herreid, president, has been organized to build a wood processing plant costing about $100,000. Plant will include kiln, planing mill and dip tanks.

FERGUS FALLS, MINN.—Ben Kilde plans new plant to replace recent fire loss, for manufacture of truck bodies, hay sweep rakes, etc.

LITTLE FALLS, MINN.—L. J. Litchy, Royalton, Minn., will open plant at Little Falls to manufacture snow plows and road machinery, to replace Royalton plant recently burned. Construction will be started as soon as materials are available.

MINNEAPOLIS—B-B Foundry & Stove Works, 245 Twelfth avenue South, has let contract to A. G. Broback Co. for one-story plant 57 x 66 feet to replace burned structure.

MINNEAPOLIS—Sterling Equipment Co., 554 Builders' Exchange building, has been organized by J. C. Yetter, to deal in construction and mining machinery.

MINNEAPOLIS—Northwest Steel & Supply Co., Paul G. Rast, president, has opened warehouse at 100 Seventeenth avenue North to handle cold-finished steels. Machinery will be installed to process steel for customers.

MINNEAPOLIS—Twin City Carbide Tool Co., 200 Washington avenue North, has been incorporated with $50,000 capital to manufacture and recondition carbide tip tools, by John C. Eide and R. H. Fryberger.

CALIFORNIA

ALBANY, CALIF.—Pacific Tank & Pipe Co., 4621 Tidewater avenue, Oakland, Calif., will build plant at Eastshore highway, in Albany. Ernest A. Tarr, 1424 Grant street, Berkeley, Calif., is engineer.

AZUSA, CALIF.—J. O. Oltmans & Son, 810 East Eighteenth street, Los Angeles, is low bidder at $156,800 for three warehouses at Abusa for Aerojet Engineering Co., 285 West Colorado street, Pasadena, Calif. Structures will be 116 x 224 feet, 78 x 263 feet and 140 x 306 feet.

LOS ANGELES—California Steel & Construction Co., 814 North Broadway, is building a 60 x 160-foot plant and office building at Medford street and Bonnie Beach place. A 310-foot craneway will be included.

LOS ANGELES—H. & G. Screw Products has been formed by Carl Hamblen, Donald W. Gotshell and Winston A. Dadom and has established its plant at 153½ South Avenue Twenty-four.

LOS ANGELES—Emsco Derrick & Equipment Co. has building permit for machine shop addition 59 x 81 feet and 20 x 157 feet, costing about $17,000, at 6811 South Alameda street, Florence district.

LOS ANGELES—Superior Welding & Mfg. Co. has been incorporated by H. Lloyd Zimmerman, Los Angeles, and associates. R. Bruce Muchison, 620 West Olympic boulevard, Los Angeles, is agent.

POMONA, CALIF.—Simpson Steel Co., Los Angeles, is erecting a steel and concrete factory building at 195 North East End avenue, 150 x 150 feet, to cost about $20,000.

SAN PEDRO, CALIF.—Marine Sheet Metal Iron Works has been formed by William H. Hall and Edwin Theobald and is conducting business at 813 and 920 South Seaside avenue, Terminal Island, San Pedro.

DPC Authorizes Plant Expansion, Equipment

Defense Plant Corp. has authorized the following expansions and equipment purchases (figures are approximate):

Bulova Watch Co., Valley Stream, L. I., N. Y., $1 million to provide equipment at Valley Stream.

High Standard Mfg. Co. Inc., New Haven, Conn., $450,000 increase in contract to provide equipment at a plant at Hampden, Conn., making overall commitment $7,700,000.

I-T-E Circuit Breaker Co., Philadelphia, $235,000 increase in contract to provide additional equipment at Philadelphia, making overall commitment $1,140,000.

Doak Aircraft Co. Inc., Torrance, Calif., $160,000 to provide equipment at its plant in Torrance.

Southern Aircraft Corp., Garland, Tex., $110,000 increase in contract to provide additional equipment at a plant at Garland, making overall commitment $1,250,000.

Iron Fireman Mfg. Co., Portland, Oreg. $110,000 increase in contract to provide additional equipment at its plant in Portland, making overall commitment $315,000.

W. F. & John Barnes Co., Rockford, Ill., $6,500,000 increase in contract to provide additional facilities at Rockford, making overall commitment $15 million.

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Help Wanted

Wanted

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A large and reputable manufacturer, specializing in the manufacture of medium and heavy machine tools, desires applications from qualified men for foreman positions open in the near future. Should be a journeyman machinist experienced in supervising and handling of labor relations of employees on the job. In replying, give full details of personal history, qualifications including training and experience, availability, salary requirements.

Address Box 871

STEEL, Penton Bldg., Cleveland 13, O.

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WANTED

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STEEL, Penton Bldg., Cleveland 13, O.

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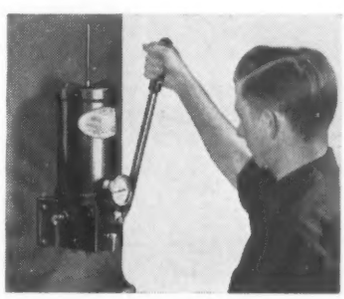
FARVAL in the West Coast Steel Industry

TO insure the continuous operation of this great new Mill in California—to provide steel production on schedule to satisfy the heavy fabrication demands of West Coast Industries—the owners have installed Farval Centralized Lubricating Systems on the 14″, 18″ and 21″ Merchant Mills and all auxiliary equipment.

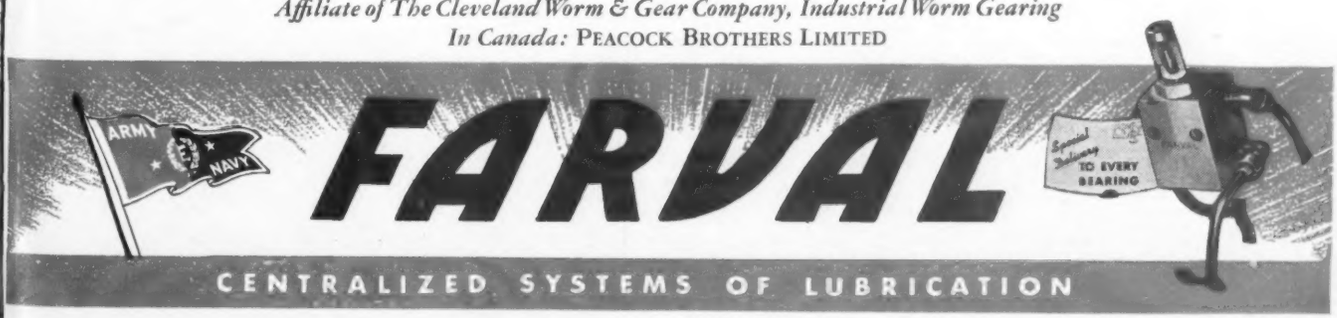
More than **75 Farval Central Stations** are delivering lubricant at regular intervals to each of **4,509 individual bearings** on the Mill Stands, Furnace Pushers, Tables, Shears, Transfers, Pinch Rolls, Hot Saw, Cooling Beds, Piler, Car Dumper and Overhead Cranes.



Thus on the West Coast, as well as throughout other Steel-Producing Districts, Farval Centralized Systems continue their 18-year proven record for increasing output and reducing costs. Install Farval on your Mill Equipment and you will eliminate the need for shutdowns to lubricate or to repair the lack of lubrication. Farval will increase your tonnage and prolong the life of your bearings.

It will pay you to get the newest facts on Centralized Lubrication. Your nearby Farval Representative has valuable information for you. Send for him today. The Farval Corporation, 3270 East 80th St., Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing
In Canada: PEACOCK BROTHERS LIMITED



JEFFREY MOLD CONVEYOR CARS ROLL ON TIMKEN BEARINGS

Photograph courtesy of The Jeffrey Mfg. Co., Columbus, Ohio.

The Jeffrey Continuous Pouring System for foundries uses continuous power-driven car-type conveyor units for carrying the molds, as shown in the photograph.

It is important that these cars travel smoothly and steadily on the track; any jerking or "walking" motion would tend to break down the molds, or possibly to disturb the metal in the mold.

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Make sure of getting Timken Tapered Roller Bearing advantages *in full;* see that the trade-mark "TIMKEN" appears on every bearing you use.

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